



# Surgical Managements of Sinonasal Inverted Papilloma

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## Abstract

### Introduction

Inverted papilloma (IP) is the most frequent benign tumors in the sinonasal region and may involves malignant lesion. Recent development of endoscopic sinus surgery (ESS) has become prevalent in the surgical treatment of IP although total resection is required. In this study, our surgical experiences and outcomes in IP cases are demonstrated.

### Methods

27 sinonasal IP cases operated on by one surgeon between 2016 and 2019 were enrolled in this retrospective study. They consisted of 18 males and 9 females, and the mean age was 61.2 years old. IP was diagnosed by biopsy before surgery in 21 cases. They were classified into T1: 3, T2: 10, and T3: 14 cases according to Krouse staging.

ESS was performed in all T1 cases. In addition to ESS, endoscopic (modified) medial maxillectomy was performed in 9 cases in T2 and T3 cases. Extended frontal sinus surgery was added in 5 T3 cases. External nasal surgery was required in 3 T3 cases.

All cases were periodically followed up more than 2 years after surgery.

### Results

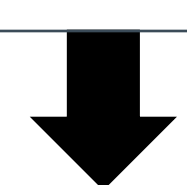
Recurrence was seen in 2 T3 cases, and the recurrent region was the roof of the ethmoid sinus and the frontal recess. The cause of recurrence seems to be residue due to severe adhesion between the stalk of IP and the bone. No malignant transformation was seen.

### Conclusions

Total resection of IP using ESS was completed in T1 and T2 cases. T3 cases still have possibility of recurrence even if external nasal surgery was performed. In order to prevent recurrence, it is necessary to make a reliable diagnosis before surgery and to resect the stalk of IP completely during surgery.

## Introduction

- ✓ IP is the most frequent benign tumors in the sinonasal region
- ✓ IP recurs frequently despite being a benign tumor
- ✓ About 10% of cases are complicated by malignancy



Complete removal of IP must be done in the first surgery

Our surgical experiences and outcomes in 27 IP cases are demonstrated.

## Patient Background ①

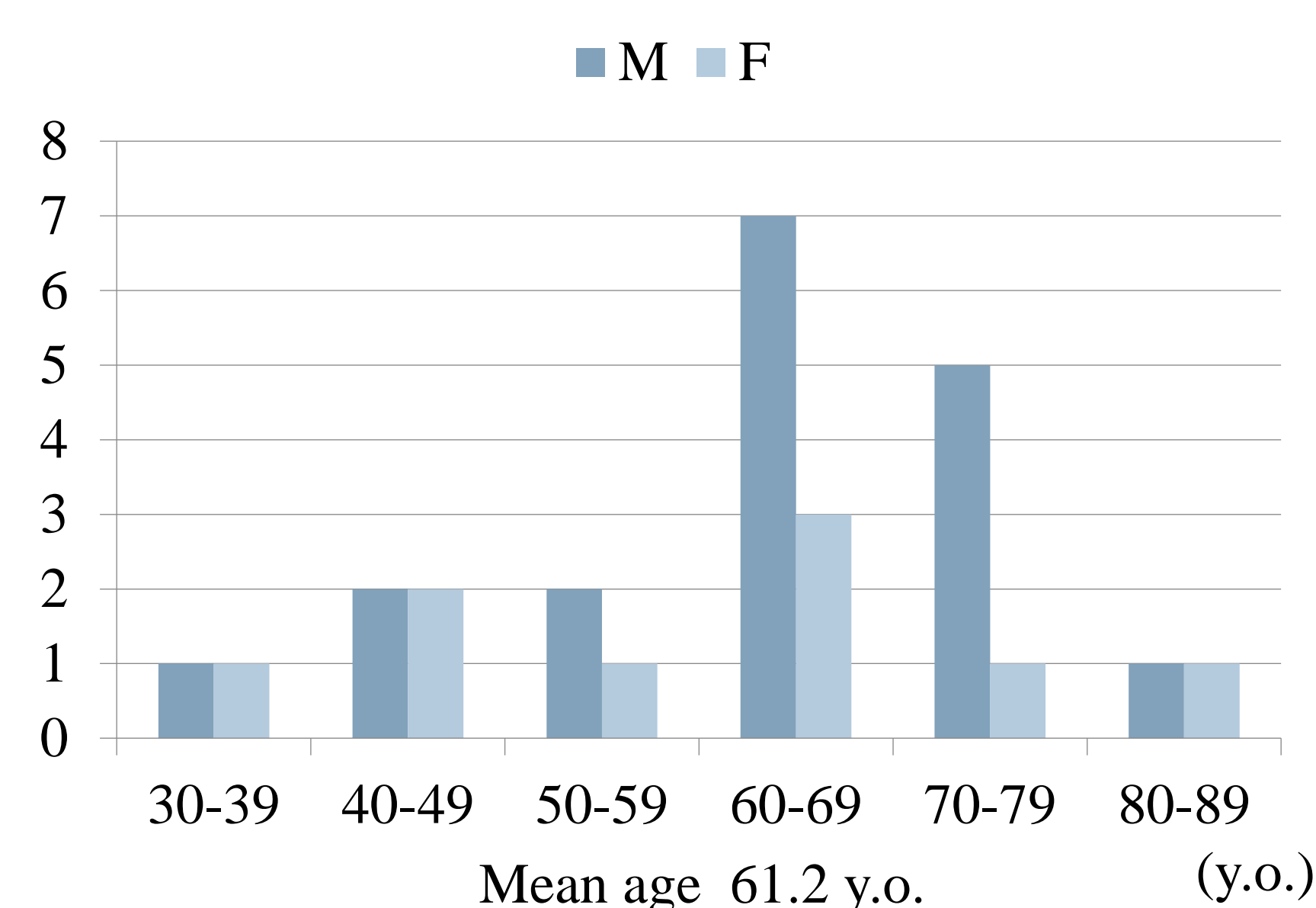


Table 1. Age

## Patient Background ②

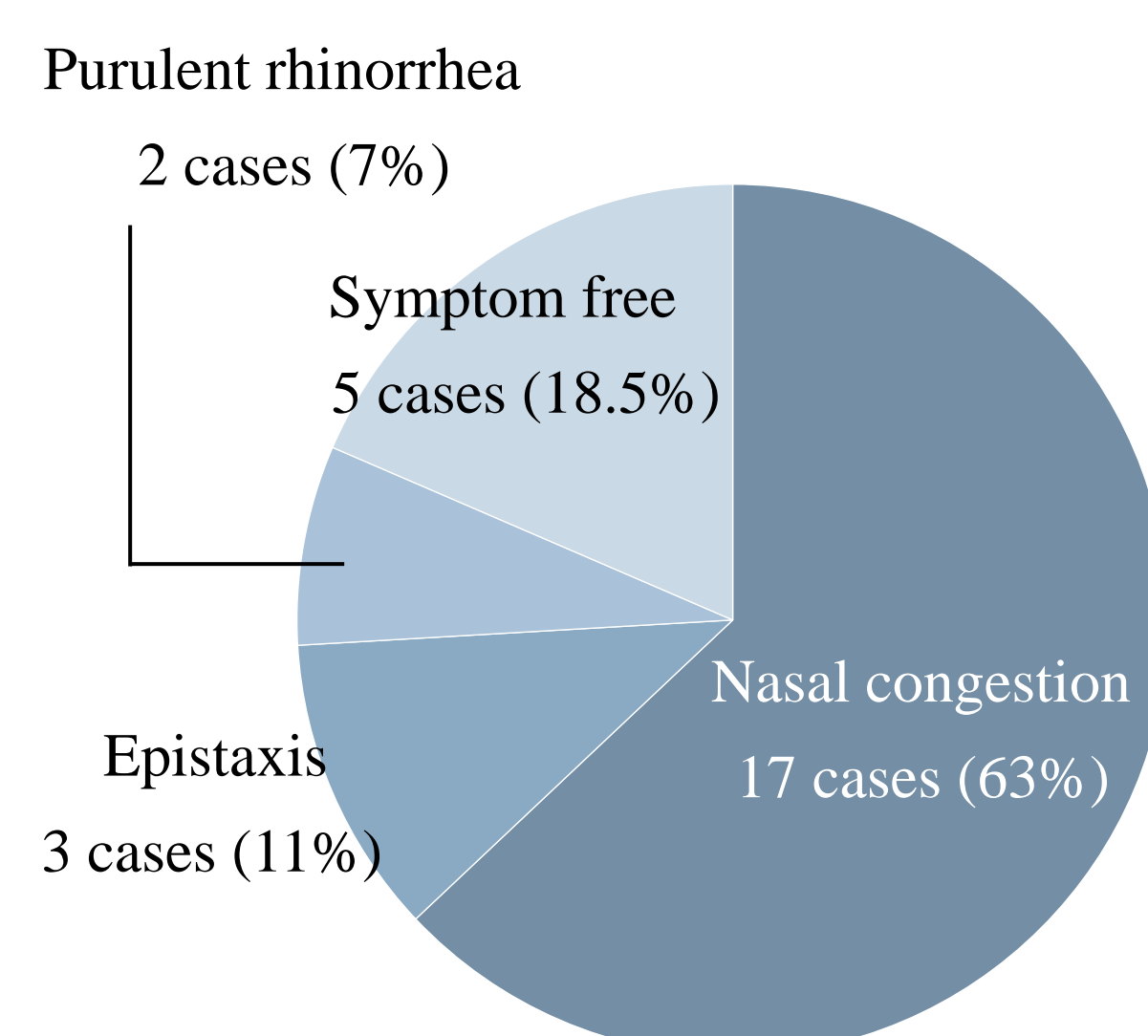


Table 2. Chief complaint

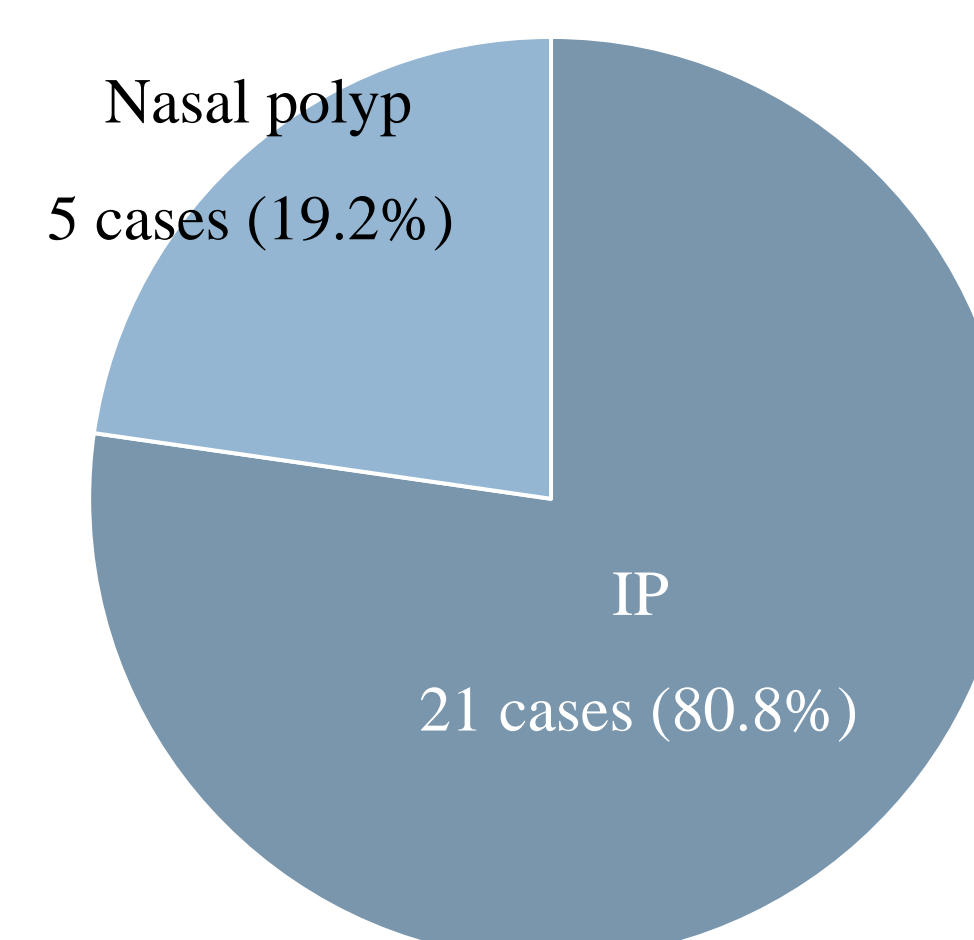


Table 3. Pathological diagnosis before surgery  
1 case was unbiopsiable.

## Recurrent Cases

	Case 1	Case 2
Age	47 y.o.	65 y.o.
Originating site of IP	Ethmoid sinus roof	Frontal recess
Krouse staging	T3	T3
Pathological diagnosis before surgery	IP	Nasal polyp
Surgical procedure	ESS	Draf type IIa
Site of recurrence	Ethmoid sinus roof	Frontal sinus
Time to recurrence	9 months	12 months
Revision surgery	ESS	Draf type IIb

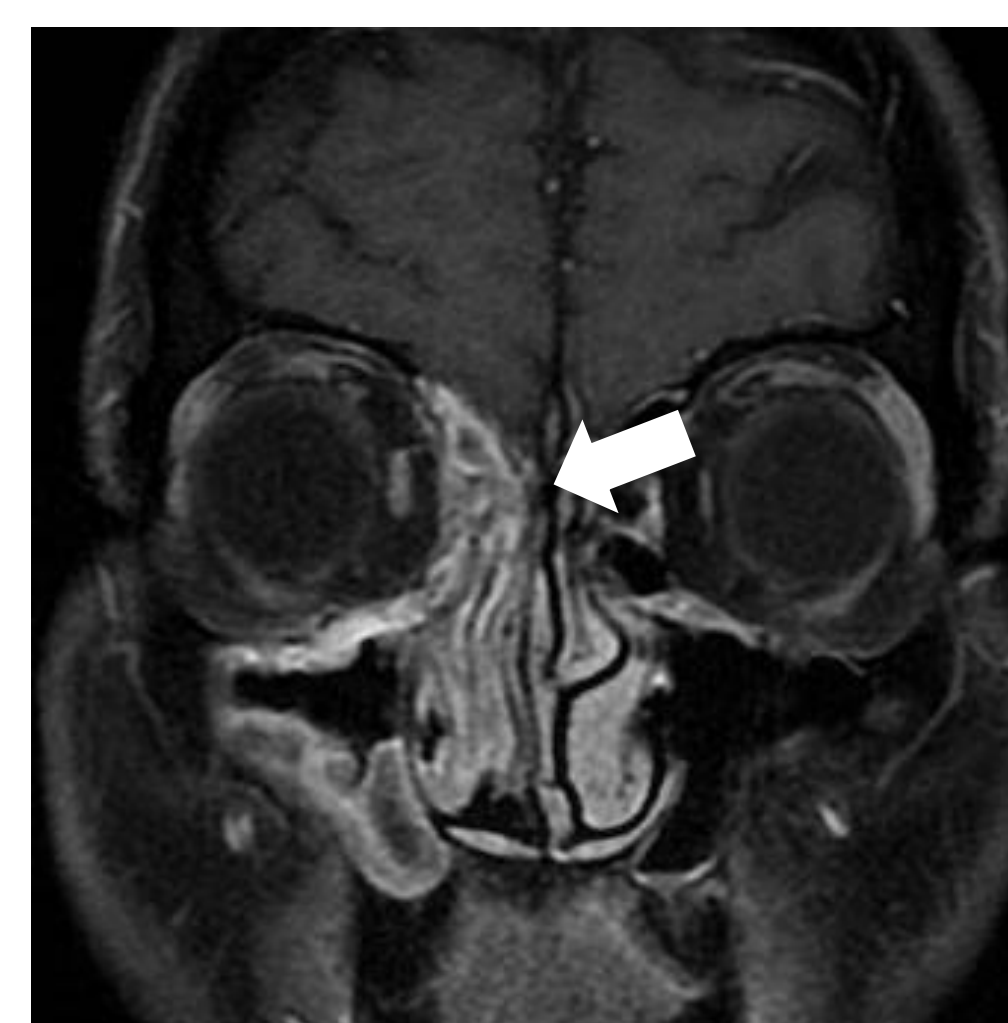


Figure 1. Enhanced MRI of case1  
Convoluted cerebriform pattern in the right ethmoid sinus (arrow)

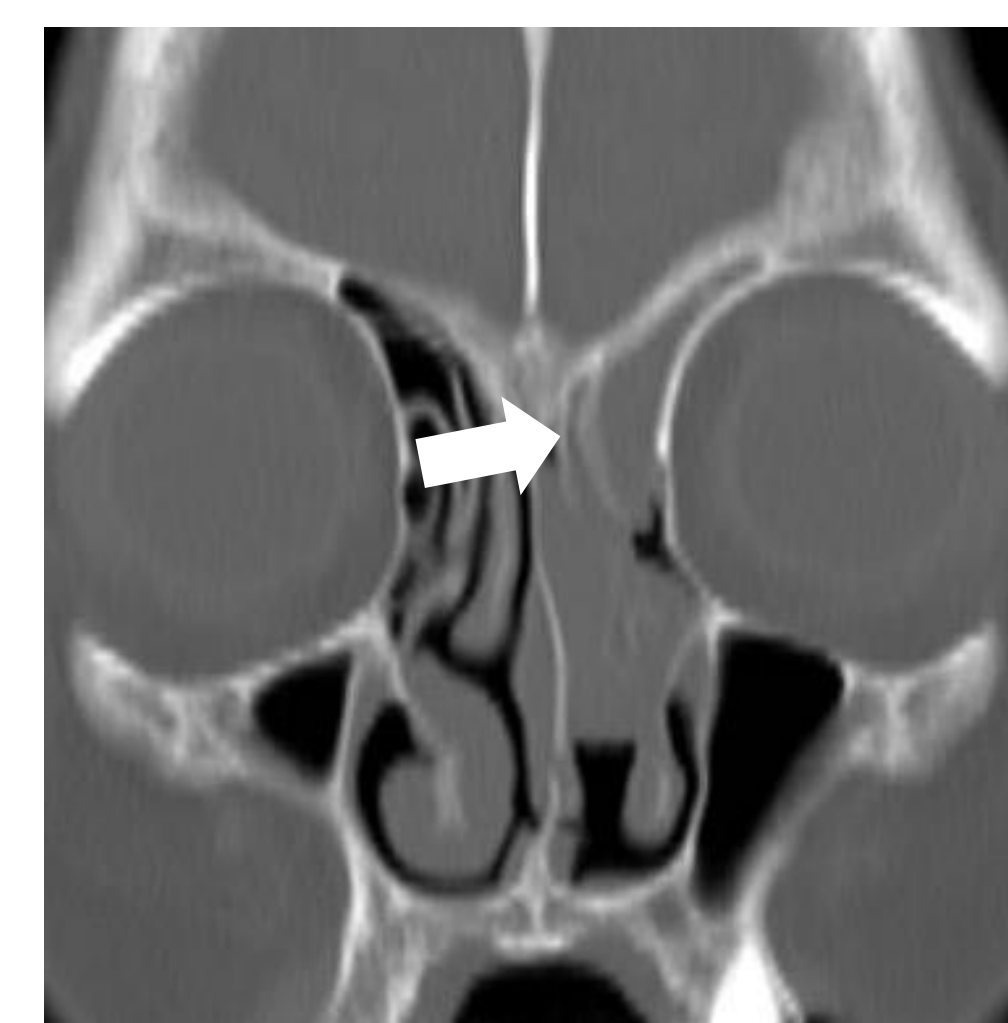


Figure 2. Plane CT of case2  
Bone thickening in left frontal recess (arrow)

## Result

Stage	Surgical procedure	Cases	Recurrence
T1	ESS	3	0
T2	ESS	5	0
	EMM	3	0
	EMMM	2	0
T3	ESS	2	1
	ESS+C-L	3	0
	EMM	3	0
	EMMM	1	0
	Draf type IIa	1	1
	Draf type IIb	2	0
Draf type III	2	0	
<b>Total</b>		<b>27</b>	<b>2</b>

Table 4. Krouse staging, Surgical procedure and Recurrent cases

EMM : endoscopic medial maxillectomy

EMMM : endoscopic modified medial maxillectomy

C-L : Caldwell-Luc procedure

## Conclusion

- 1) 27 cases of IP were examined retrospectively.
- 2) Recurrence was found in 2 T3 cases.
- 3) To prevent recurrence
  - ✓ Accurate preoperative diagnosis
    - Repeat biopsy if in doubt
    - Consider intraoperative frozen section analysis if necessary
  - ✓ Selection of appropriate surgical procedure
  - ✓ Reliable treatment of originating site
    - Complete removal of mucosa
    - Sufficient shaving of thickening bone
- 4) Recurrences often occur within 2 years after surgery, thus careful follow-up is needed.

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