



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

의학석사 학위논문

서울아산병원에서 경험한 비부비동
양성 종물 임상 경험에 대한 연구

Analysis of clinical experience of benign sinonasal mass
lesion: Asan Medical Center experience

울산대학교 대학원

의 학 과

구 자 윤

서울아산병원에서 경험한 비부비동
양성 종물 임상 경험에 대한 연구

지도교수 유 명 상

이 논문을 의학석사 학위 논문으로 제출함.

2024 년 2 월

울산대학교 대학원
의 학 과
구 자 윤

구자윤의 의학석사 학위 논문을 인준함.

심사위원 장 용 주 (인)

심사위원 정 유 삼 (인)

심사위원 유 명 상 (인)

울 산 대 학 교 대 학 원

2024 년 2 월

국문 요약

배경

양성 비부비동 종물은 발생 빈도가 낮은 질환이다. 지금까지 양성 비부비동 종물에 대한 연구는 개별 질환을 위주로 수행되었으며, 단일 의료 기관에서 이루어진 양성 비부비동 종물에 대한 대규모 데이터 검토는 드물었다. 따라서 본 연구에서는 단일기관에서 비부비동 양성 종물로 치료받은 다수의 증례들을 분석하여 제시하고자 한다.

방법

2000년부터 2022년까지 서울아산병원에서 수술받은 1604명의 양성 비부비동 종물 환자의 모든 의료 기록을 후향적으로 검토하였다. 악성종양 및 단순 폴립 사례는 연구에서 제외되었다. 인구 통계, 임상 증상, 병리학적 보고서, 영상학적 소견, 수술 기록 및 임상 예후를 수집하였으며 서술적 통계를 사용하여 분석했다.

결과

88가지의 다양한 양성 비부비동 종물이 진단되었다. 반전성 유두종(585건, 36.4%)이 가장 흔한 종류로 나타났으며, 다음으로 상악동후비공 용종(349건, 21.7%)이었다. 88명의 환자(5.5%)에서 재발하였고, 52명의 환자(3.2%)가 수술

후 잔여 병변을 보였다. 전체 환자의 평균 연령은 43.6 세이며, 대부분은 30~40 세 이후에 진단되었다. 그러나 상악동후비공 용종 및 소아 코인두혈관섬유종의 경우 평균 진단 연령은 각각 24.2 세와 6.5 세로 확인되었다. 가장 흔한 주증상은 비폐색(56.6%)이었으며, 다음으로 비강 종물(8.3%) 및 영상 검사에서 우연히 발견된 병변(7.1%)이었다. 연구 기간을 2011 년 이전과 이후로 나눌 때, 내시경 접근만을 사용하여 수술한 경우가 59.7%에서 73.8%로 증가하였다.

결론

양성 비부비동 종물은 다양한 병리학적인 원인으로 발생할 수 있음을 확인하였다. 가장 흔한 질병군은 반전성 유두종이었다. 전체 양성 비부비동 종물 환자들의 재발률은 5.5% 였다. 대부분의 경우 비폐색이 주요 증상으로 나타나지만 일부 종물은 출혈, 비강 종물, 얼굴 부종 등과 같은 주소를 호소함이 관찰되었다. 과거에 비해 양성 비부비동 종물의 수술적 치료 방법으로 내시경 수술의 빈도가 증가했다는 사실을 확인할 수 있었다. 가장 환자수가 많았던 반전성 유두종에서도 내시경 수술의 빈도가 과거에 비해 증가했으며 재발률은 비슷하게 유지됨을 확인할 수 있었다. 이러한 결과들은 앞으로 양성 비부비동 종물의 진단과 치료에 대한 더 나은 통찰력을 제공할 것으로 기대된다.

차 례

국문 요약	i
표, 그림 목차	iv
서론	1
연구대상 및 방법	3
결과	5
고찰	9
결론	17
참고 문헌	27
영문 요약	30

Table Contents

Table 1. Pathologic outcome of benign sinonasal mass lesions	18
Table 2. Demographics, recurrence, disease free period of recurrence cases, residual disease, mean follow-up period of benign sinonasal mass lesions.....	19
Table 3. Demographics, origin site, surgical approach, and recurrence of inverted papilloma patients.....	20
Table 4. Comparison of frequent chief complaint of benign sinonasal mass lesions	21

Figure Contents

Figure 1. Numbers of the cases of the benign sinonasal mass lesions	22
Figure 2. Proportion of chief complaint of the patients of the benign sinonasal mass lesions	23
Figure 3. Proportion of three groups of different surgical approach divided by chronological timeline	24
Figure 4. Endoscopic findings of benign sinonasal tumors.....	25

INTRODUCTION

Benign sinonasal mass lesions are rare medical conditions. They can present with various symptoms, but nasal congestion and frequent epistaxis are common, and the symptoms may resemble those of inflammatory conditions such as sinusitis.¹⁾ Therefore, differentiation based solely on symptoms can be challenging. Symptoms are more commonly presented unilaterally than bilaterally, and if the symptoms persist or worsen over time, comprehensive clinical and additional imaging assessments should be performed. When a benign sinonasal mass lesion is confirmed, a histological examination is essential for an accurate diagnosis, enabling appropriate treatment.

The treatment of benign sinonasal tumors typically needs appropriate surgical removal. The choice of surgical approach is determined by factors such as the type, size, and location of the tumor. Since the introduction of endoscopic surgery in the 1980s, endoscopic techniques have continued to evolve. The indications for surgical approaches have diversified over time.²⁾ While non-endoscopic approaches, such as the Caldwell-Luc operation, midfacial degloving approach, and lateral rhinotomy approach were preferred in the past, advances in endoscopic surgery and accumulated experience have led to the exploration of various endoscopic surgical techniques.²⁾⁻⁴⁾

Non-endoscopic approaches enable easy instrument access but have the drawback of leaving external scars. In contrast, endoscopic approaches do not leave external scars, and

they provide magnified visualization through the endoscope. With the introduction of various instruments and advancements in surgical techniques, endoscopic surgery for the removal of benign sinonasal tumors is reportedly non-inferior to non-endoscopic surgery.⁵⁾

8)

Research on benign sinonasal mass lesions has been conducted on a disease-specific basis, and comprehensive studies that include large number of cases have been rare owing to the low incidence in this disease group. Therefore, we aimed to investigate the outcomes of surgical treatment for benign sinonasal mass lesions, and the surgical approaches used over an extended period at a single institution, involving a significant number of patients with the benign sinonasal mass lesions.

MATERIALS AND METHODS

The medical records of all patients with benign sinonasal mass lesions who underwent surgical treatment or surgical biopsy at the Department of Otorhinolaryngology, Head & Neck surgery of Asan Medical Center between 2000 and 2022 were retrospectively reviewed. All cases were evaluated clinically, and endoscopic examination and preoperative imaging were performed if needed. Cases of malignancy and simple polyps were excluded. Data on demographics, clinical presentations, pathological reports, radiologic findings, operative records, follow-up period, and outcomes including recurrence and residual disease, were collected and analyzed using descriptive statistics.

Preoperative simple radiography, computed tomography (CT) scan or magnetic resonance imaging (MRI) was performed, if needed. Before surgical management, endoscopic examination and preoperative biopsy were performed in an outpatient clinic, if needed.

Diagnoses were confirmed based on post-operative pathological findings, and when necessary, diagnosis was determined by referring to radiological findings. Sinonasal papilloma was classified into inverted, exophytic, and oncocytic papilloma. Cystic diseases were categorized as odontogenic cysts and other cyst types. Cases with past diagnoses of pyogenic granuloma were reclassified as lobular capillary hemangioma.

The surgical methods were reviewed by examining surgical names and surgical records. Surgical methods were categorized into the endoscopic approach (EA)-alone, EA-with-

adjuvant-external-approach, and external-approach-alone groups. The study period was divided into two groups, from 2000 to 2011 and from 2012 to 2022, and the differences in the proportions of the three surgical approach groups were compared.

After surgical management, all patients underwent follow-up examination at an outpatient clinic. Surgical site dressing and endoscopic examination were performed, and postoperative imaging was done in selected patients. In cases where signs of recurrence were observed during a physical examination or suspected on follow-up imaging, tissue examinations were conducted in the outpatient clinic or the operating room. In cases where recurrence was confirmed, the duration from the initial diagnosis to the date of recurrence was measured. The final follow-up period was determined from the surgery date to the last visit to the otolaryngology outpatient department at our institution.

RESULTS

Demographics

The data of 1604 patients (1007 male and 597 female; mean age, 43.6 years; mean follow-up duration, 21.6 months) with benign sinonasal tumors that underwent surgery from 2000 to 2022 were examined. In total, 88 patients experienced recurrence (overall recurrence rate, 5.5%), and 52 had residual disease postoperatively (overall residual disease rate, 3.2%).

Histopathological Type

There were 585 patients with inverted papilloma, 349 with antrochoanal polyp, 86 with nasolabial cyst, 82 with organizing hematoma, 69 with lobular capillary hemangioma, 54 with osteoma, 30 with juvenile nasopharyngeal angiofibroma, 34 with exophytic papilloma, 11 with oncocytic papilloma, and 2 with sinonasal papilloma without subtyping. There were 40 cases of odontogenic cyst, including odontogenic cyst, dentigerous cyst, odontogenic keratocyst, radicular cyst, periapical cyst, and keratocystic odontogenic cyst. Other cystic lesions were nasopalatine duct cyst (n=13), epidermal cyst (n=3), dermoid cyst (n=3), epidermoid cyst (n=1), keratocyst (n=1), nasal dermoid sinus cyst (n=1), orbit hematic cyst (n=1), and lymphoepithelial cyst (n=1). There were 26 cases of hemangioma and 43 cases of osseous and fibro-osseous tumor, including 29 fibrous dysplasia and 14 ossifying fibroma cases. There were 16 patients with schwannoma, 14 with angioleiomyoma, 10 with

pleomorphic adenoma. In total, 88 different types of pathologic types were identified, including less than 10 cases each (**Figure 1., Table 1.**).

The mean ages of patients with inverted papilloma, organizing hematoma, nasolabial cyst, lobular capillary hemangioma, odontogenic cyst, fibrous dysplasia, schwannoma, angioleiomyoma, pleomorphic adenoma, and ossifying fibroma were 55.0, 45.0, 52.5, 45.0, 45.3, 42.1, 33.3, 40.1, 57.0, 42.6, and 34.5 years, respectively. The mean ages of patients with antrochoanal polyp and juvenile nasopharyngeal angiofibroma were 24.2 and 6.5 years, respectively. The recurrence rates of inverted papilloma, antrochoanal polyp, and organizing hematoma were 6.5%, 10.0%, and 0%, respectively. The average disease-free period of recurrence cases was 29.0 and 34.3 months in inverted papilloma and antrochoanal polyp cases, respectively. The rates of residual disease of fibrous dysplasia, ossifying fibroma, osteoma, juvenile nasopharyngeal angiofibroma were 72.4%, 27.3%, 9.3%, and 13.3% respectively (**Table 2.**).

The most common disease was inverted papilloma (n=585). The average age of the patient group was 55.0 years, and the male-to-female ratio was 2.7:1. The maxillary sinus was the most prevalent origin site, accounting for 43.4% with 254 cases. When the groups were divided chronologically, the recurrence rates were 6.6% and 6.4% in the 2000–2011 and 2012–2022 groups, respectively. Regarding the surgical approach, the percentage of cases treated with an endoscopic approach alone was 49.1% before 2011 and increased to 69.4% after 2011 (**Table 3.**).

Among the patient chief complaints, nasal obstruction was the most common chief complaint, accounting for 56.6% of cases, followed by nasal mass (8.3%), incidental lesion on image (7.1%), rhinorrhea (6.7%), epistaxis (6.4%), and headache (2.6%). Nasal obstruction was the most common chief complaint in cases of inverted papilloma, antrochoanal polyp, organizing hematoma, juvenile nasopharyngeal angiofibroma, and schwannoma. Nasal mass was the predominant chief complaint in patients with nasolabial cyst and squamous papilloma. Epistaxis was the most common chief complaint for those with lobular capillary hemangioma, and fibrous dysplasia was discovered incidentally on imaging examination (**Table 4., Figure 2.**).

Origin site

Among 82 cases, 77 (93.9%) of organizing hematoma originated from the maxillary sinus, 2 (2.4%) in the frontal sinus, 2 (2.4%) in the nasal cavity, and 1 (1.2%) in the sphenoid sinus. Schwannoma had its highest prevalence in the nasal cavity (n=8; 50.0%), but it also originated from various locations, such as the ala, cheek, dorsum subcutaneous layer, ethmoid sinus, infratemporal fossa, and pterygopalatine fossa. In cases of angioleiomyoma, it predominantly originated from the inferior turbinate in five cases (35.7%): three (21.4%) from the septum and two (14.3%) from the vestibule. In 10 cases of pleomorphic adenoma, seven originated from the septum, while two and one cases originated from the nasal floor and the maxillary sinus, respectively.

The origin sites of fibro-osseous lesions, including osteoma, fibrous dysplasia, and ossifying fibroma, were also analyzed. Osteoma was most frequently found in the ethmoid sinus (66.7%), followed by the frontal sinus (29.6%). Fibrous dysplasia predominantly involved the maxilla (58.6%), with the ethmoid bone (44.8%) being the second most affected site. Ossifying fibroma was observed in 57.1% of cases originating from the maxilla, followed by the ethmoid (28.6%) and frontal bones (14.3%).

Surgical approach

In total, 1080 cases underwent surgical resection with endoscopic approach alone. Especially, 314 patients were treated with combination approach with endoscopic and other external approaches, including canine fossa, Caldwell–Luc, lateral rhinotomy, facial degloving, and open rhinoplasty approaches. There were 180 and 31 patients who underwent surgical resection with only external approach and simple excision without using endoscope, respectively.

The EA-alone group, EA-with-adjunctive-external-approach group, and external-approach-alone groups had recurrence rates and mean follow-up periods of 6.0%, 4.5%, and 4.4%, and 19.1, 31.7, 21.5 months, respectively.

When the patient population was divided into two groups based on the chronological timeline, the total number of cases were 581 (59.7%) and 993 (73.8%) in the groups of 2000–2010 and 2011–2022, respectively (**Figure 3**).

DISCUSSION

In this study, we retrospectively analyzed a cohort of patients with benign sinonasal mass who underwent surgical resection or surgical biopsy at Asan Medical Center between 2000 and 2022. Our findings described various aspects of these masses, including patients' demographic characteristics, clinical presentations, recurrence rates, and treatment approaches. In total, 88 different types of benign sinonasal masses were diagnosed, and the overall recurrence rate was 5.5%. The most prevalent condition was inverted papilloma, followed by antrochoanal polyp. The group with the highest recurrence rate was antrochoanal polyp, demonstrating a recurrence rate of 10.0%. While the average age at the time of diagnosis was typically over the 30–40-year age range, patients with juvenile nasopharyngeal angiofibroma and antrochoanal polyp underwent surgery at a younger age. Our results showed that nasal obstruction was the most common chief complaint among patients, followed by other symptoms, such as nasal mass, rhinorrhea, and epistaxis. Cases that were approached using the endoscopic approach alone accounted for 59.7% before the year 2011, and from 2012 onwards, they comprised 73.8% of the total cases.

Demographics

In this study, 88 different disease groups were diagnosed. Most disease groups had very few cases, typically <10 cases. In a previous study that treated 185 patients with benign

sinonasal tumors through the endoscopic approach, inverted papilloma was the most frequent at 64.3%, followed by hemangioma and lobular capillary hemangioma.⁹⁾ In our study, inverted papilloma was the most common (36.4%), followed by antrochoanal polyp (21.7%), nasolabial cyst (5.4%), and organizing hematoma (5.1%). While inverted papilloma remained the most prevalent, there were differences in the proportion ratio. The difference in the overall population size exists, and we believe that there would have been a difference in the composition ratio as we did not distinguish based on the surgical method in this study. Nevertheless, inverted papilloma had the highest incidence.

In cases of inverted papilloma, the average age at diagnosis was 55.0 years. Organizing hematoma (average age, 45.0 years), nasolabial cyst (average age, 52.5 years), lobular capillary hemangioma (average age, 45.0 years), and osteoma (average age, 45.3 years) were typically diagnosed after the fourth decade of life. Conversely, patients with juvenile nasopharyngeal angiofibroma, antrochoanal polyp, fibrous dysplasia, and ossifying fibroma were diagnosed at the average ages of 6.5, 24.2, 33.3 years, and 34.5 years, respectively, indicating relatively younger ages at diagnosis. These findings are consistent with those of previous works, which reported that inverted papilloma, ossifying fibroma, and Juvenile nasopharyngeal angiofibroma had its peak prevalence in the fourth to seventh decades,¹⁾ second to third decades,¹⁰⁾ and second decades of life, respectively,¹¹⁾ while antrochoanal polyp had its peak incidence in childhood and young adult age.¹²⁾ The confirmation of similar age trends in our study emphasized the importance of considering

the patient's age when evaluating potential diagnoses upon the discovery of benign sinonasal tumors.

Symptoms

In previous studies, the most common symptom of benign sinonasal tumors was unilateral nasal obstruction followed by epistaxis. In our study, similar to previous researches, nasal obstruction (49.3%) remained the most common chief complaint, followed by nasal mass (8.3%) and incidental findings on imaging (7.1%). This observation is attributed to the environment of our institution, a tertiary hospital that conducts numerous imaging examinations and receives referrals from various other healthcare facilities. In this study, cases where the chief complaint was an incidental finding accounted for 7.1%. Among patients presenting with incidental findings, 50 cases (44.2%) were identified as having inverted papilloma, while fibro-osseous lesions and cystic lesions were observed in 20 (17.7%) and 15 cases (13.3%), respectively. When categorizing based on the origin site of the lesions, the majority were maxillary sinus origin, constituting 53 cases (46.9%), followed by ethmoid sinus origin with 17 cases (15.0%), and nasal cavity origin with 12 cases (10.6%). Further research is needed to explore any potential relationships between patients presenting with incidental findings as their chief complaint and specific pathologies or origin sites.

When examining different disease groups, nasal obstruction remained the most common

chief complaint among patients with benign sinonasal tumors. Considering inverted papilloma, the most common symptom is unilateral nasal obstruction, and as the tumor grows, symptoms such as epistaxis and headaches may also occur. According to this study, the most common chief complaint of patients of inverted papilloma was nasal obstruction, with 56.6% of patients presenting with this complaint. However, in cases of lobular capillary hemangioma, epistaxis was the most frequent complaint, while incidental findings were more prevalent in cases of fibrous dysplasia. While symptoms alone may not definitively distinguish histological types, they can still be considered when making initial impressions before histological examination is completed. Ultimately, histological examination is the most crucial for diagnosis. However, endoscopic findings also play a significant role in determining the impression of the disease and guiding the course of treatment. For example, in cases of inverted papilloma, characteristic features, such as a rich vascular distribution, irregular surface, and a mulberry-like appearance, sometimes surrounded by a simple polyp, are observed. **Figure 4.** presents distinctive endoscopic findings among the included cases.

Origin site

The most common origin site of inverted papilloma is the lateral nasal wall, followed by the maxillary sinus, ethmoid sinus, nasal septum, frontal sinus, and sphenoid sinus.^{13), 14)} In this study, the maxillary sinus was the most common origin site (43.4%), followed by the lateral nasal wall, ethmoid sinus, frontal sinus, septum, and sphenoid sinus.

Organizing hematoma has been predominantly reported to originate from the maxillary sinus in previous studies.¹⁸⁾ In this study, 93.9% of cases had their origin in the maxillary sinus, while the remaining cases having their origin in the nasal cavity, frontal sinus, or sphenoid sinus were extremely rare. Schwannoma primarily originates from the nasal cavity and ethmoid sinus.^{19), 20)} In the present study, among schwannomas found in the nasal cavity (50.0%), septum-origin cases were the most common (18.8%), but tumors could arise in various locations. This reflects the nature of tumors that can occur anywhere there are peripheral nerves. Angioleiomyoma is an exceptionally rare condition in the sinonasal tract, with limited mentions in previous literature.²¹⁾ In this study, it was mostly found in the nasal cavity. Pleomorphic adenoma is typically reported to be discovered in the septum or lateral nasal wall.²²⁾ Similarly, this study revealed septum-origin in 70% of cases, consistent with previous findings.

Surgical outcomes

A 6.5% recurrence rate was observed in cases of inverted papilloma, and patients who experienced a recurrence had an average time to recurrence of 29.0 months. Antrochoanal polyp had a 10.0% recurrence rate (average time to recurrence, 34.3 months), while juvenile nasopharyngeal angiofibroma exhibited a 10.0% recurrence rate (average time to recurrence, 31.2 months). Previous works have reported even higher recurrence rates than those found in our study.^{5), 9)} A previous study that focused on inverted papilloma showed

that the mean interval to recurrence was 29–49 months.⁵⁾ In our study, recurrence of benign sinonasal tumors often occurs >2 years after surgical removal, emphasizing the importance of having a sufficiently long follow-up period.

Notably, high residual rates were observed in specific conditions, such as juvenile nasopharyngeal angiofibroma, osteoma, fibrous dysplasia, ossifying fibroma, and meningioma. In cases of juvenile nasopharyngeal angiofibroma, sphenopalatine origin site was the most common source of residual lesions. Conditions, such as fibrous dysplasia, ossifying fibroma, and osteoma, often presented challenges in achieving complete resection owing to the nature of the disease, leading to a higher prevalence of partial resections to address cosmetic or functional concerns. Fibrous dysplasia often exhibits a nature, in which the growth of the tumor slows down or stops after the onset of puberty. In a previous study, only the symptomatic or esthetically problematic portions are partially excised.¹⁵⁾ In this study, there were cases where only a biopsy was performed to confirm the pathology, followed by regular observation. Surgery was performed in cases where there were changes in facial appearance due to the manifestation of the tumor in the facial bones. Ossifying fibromas primarily occur most frequently in the mandible, and when they occur around the sinonasal tract, they have a more aggressive nature compared to cases originating in the mandible.^{16),17)} Therefore, if possible, planning for complete excision is desirable. In this study, cases with lesions invading the orbit or skull base and cases with extensive lesions were subjected to follow-up observation with residual lesions, while

attempts were made to achieve complete excision in cases where total excision was possible. Meningioma originates from the brain and frequently presents wide-spread lesions. Therefore, only partial resection or surgical biopsy was conducted, and a subsequent patient follow-up period was provided in the neurosurgery department.

Surgical approach

When divided by chronological timeline, the frequency of surgical procedures using endoscopy alone increased from approximately 59.7% over a span of 10 years to 73.8%. This trend aligns with recent studies,^{2), 3)} demonstrating the diversification of endoscopic approaches and the widening range of indications. However, there are still cases where endoscopic surgery alone may not be a suitable replacement, necessitating appropriate non-endoscopic approaches.

In terms of inverted papilloma, previous studies have suggested that, with appropriate case selection, endoscopic approaches may result in adequate removal and lower recurrence rates compared to those of external approaches.²⁾⁻⁴⁾ This study compared surgical approaches before and after 2011, finding that the proportion of cases treated with an endoscopic approach alone increased from 49.1% before 2011 to 69.4% after 2011. The overall recurrence rates were measured at 6.6% and 6.4%, respectively (**Table 3.**). This trend also suggests a growing importance of endoscopic surgery, and it is speculated that satisfactory outcomes can be achieved through endoscopic procedures.

However, this study had some limitations. Especially, it focused only on benign cases, excluding malignant transformation cases of inverted papilloma. Moreover, as it was a retrospective study, the heterogeneity within the patient population limited the use of statistical analysis as a constraint.

Benign sinonasal mass lesions exhibit high diversity, but their occurrence is relatively infrequent, making it challenging to gather and analyze a substantial number of cases. This study possessed a strength in that it analyzed a larger number of cases and had an extended duration compared to those of other studies reported to date.

CONCLUSION

The benign sinonasal mass lesions can arise from various pathological conditions. The most common pathology was inverted papilloma. The overall recurrence rate for all cases was 5.5%. In most cases, nasal obstruction is the predominant presenting symptom, but some mass lesions may also manifest with symptoms such as epistaxis, nasal mass, facial edema, and others. It was noted that the frequency of endoscopic surgery as a surgical treatment approach for benign sinonasal mass lesions has increased compared to that in the past. Even within inverted papilloma, the frequency of endoscopic surgery has increased compared to the past, with a recurrence rate that remained relatively consistent. These results may offer improved insights for the diagnosis and management of benign sinonasal mass lesions.

Table 1. Pathologic outcomes of benign sinonasal mass lesions.

Sinonasal papilloma	n	Vascular neoplasm	n	Others	n
Inverted papilloma	585	Lobular capillary hemangioma	69	Nodular fasciitis	2
Exophytic papilloma	34	JNA	30	Odontogenic myxoma	2
Oncocytic papilloma	11	Other hemangiomas	26	Xanthogranuloma	2
Other sinonasal papilloma	2	Vascular malformation	4	Dermoid tumor	1
Choanal polyp		Organizing hematoma	82	Fibroma	1
ACP	349	Neuroectodermal tumor		Fibromatosis	1
SCP	6	Schwannoma	16	Fibrous histiocytoma	1
ECP	2	Meningioma	8	Fibroanthoma	1
CP	3	Neurofibroma	6	Giant cell angiofibroma	1
Cystic lesions		Meningoencephalocele	5	Hemangioendothelioma	1
Nasolabial cyst	86	Atretic cephalocele	1	IMT	1
Odontogenic cyst	40	Others		Melanocytic nevus	1
Nasopalatine duct cyst	13	Angioleiomyoma	14	Osteoclastoma	1
Epidermal cyst	3	Pleomorphic adenoma	10	Sebaceous adenoma	1
Dermoid cyst	3	Squamous papilloma	6	Seborrheic keratosis	1
Epidermoid cyst	1	Solitary fibrous tumor	6	Trichoepithelioma	1
Keratocyst	2	Glomangiopericytoma	7	Trichofolliculoma	1
Nasal dermoid sinus cyst	1	Glomus tumor	5		
Orbit hematic cyst	1	Ameloblastoma	4		
Lymphoepithelial cyst	1	Cholesterol granuloma	3		
Fibro-osseous lesion		Amyloidosis	2		
Osteoma	54	Angiofibroma	2		
Fibrous dysplasia	29	Ectopic tooth	2		
Ossifying fibroma	14	Leiomyoma	2		
Hamartoma		Lipoma	2		
REAH	6	Lymphangioma	2		
Other hamartomas	4	Melanotic oncocytic metaplasia	2		

ACP; antrochoanal polyp, SCP; sphenochonal polyp, ECP ethmoidochonal polyp, CP;

choanal polyp, REAH; respiratory epithelial adenomatoid hamartoma, JNA; juvenile

nasopharyngeal angiofibroma, IMT; inflammatory myofibroblastic tumor

Table 2. Demographics, recurrence, disease free period of recurrence cases, residual disease, mean follow-up period of benign sinonasal mass lesions.

	Age (average, Yr)	Cases	Recurrence (N, rate (%))	Disease free period of recurrence cases (months)	Residual disease (N, rate (%))	Mean follow- up period (months)
Inverted papilloma	55.0	585	38 (6.5)	29.0	0 (0)	27.9
Antrochoanal polyp	24.2	349	35 (10.0)	34.3	0 (0)	18.0
Organizing hematoma	45.0	82	0 (0)	-	0 (0)	27.9
Nasolabial cyst	52.5	86	1 (1.2)	92.0	0 (0)	5.5
LCH	45.0	69	2 (2.9)	16.9	0 (0)	7.3
JNA	6.5	30	3 (10.0)	31.2	4 (13.3)	64.7
Osteoma	45.3	54	0 (0)	-	5 (9.3)	18.3
Fibrous dysplasia	33.3	29	0 (0)	-	21 (72.4)	42.5
Ossifying fibroma	34.5	11	0 (0)	-	3 (27.3)	45.4
Schwannoma	40.1	16	1 (6.3)	29.0	0 (0)	24.9
Angioleiomyoma	57.0	12	0 (0)	-	0 (0)	22.1
Pleomorphic adenoma	42.6	10	0 (0)	-	0 (0)	9.1

LCH; lobular capillary hemangioma, JNA; juvenile nasopharyngeal angiofibroma

Table 3. Demographics, origin site, surgical approach, and recurrence of inverted papilloma

patients. (N=585)

Patients of inverted papilloma (N=585)		
Mean age (year)	55.0	
Male:Female	428:157 (2.7:1)	
Origin site (N, (%))	MS	254 (43.4)
	Lateral nasal wall	145 (24.8)
	ES	128 (21.9)
	FS	14 (2.4)
	Septum	18 (3.1)
	SS	14 (2.4)
	Group	2000-2011
Endoscopic approach alone	111 (49.1)	249 (69.4)
Endoscopic approach with adjunctive external approach	101 (44.7)	102 (28.4)
External approach alone	14 (6.2)	8 (2.2)
Recurrence (N, (%))	15 (6.6)	23 (6.4)

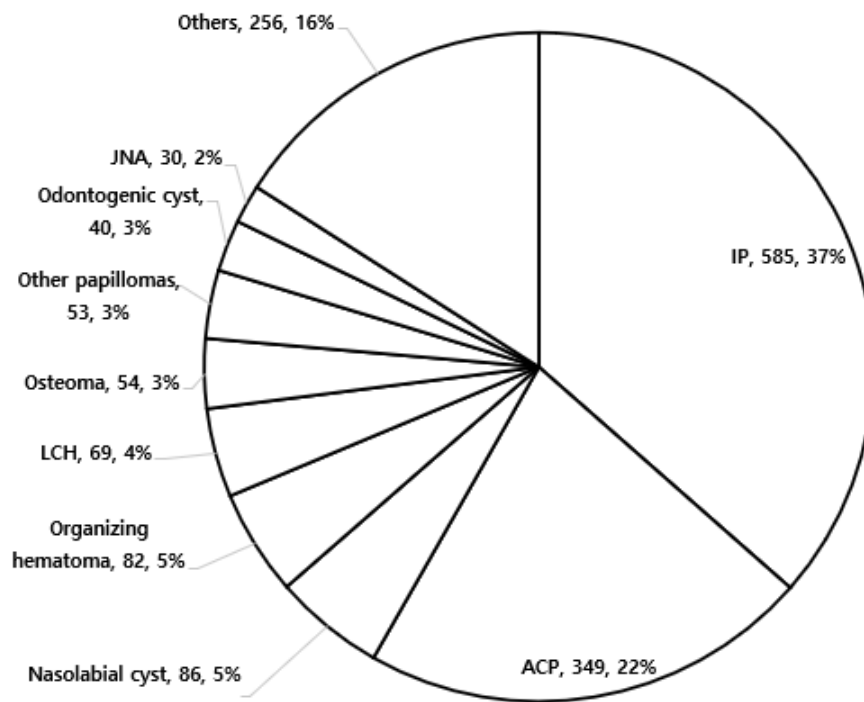
MS, maxillary sinus; ES, ethmoid sinus; FS, frontal sinus; SS, sphenoid sinus; NC, nasal

cavity

Table 4. Comparison of frequent chief complaint of benign sinonasal mass lesions.

Type	Most frequent chief complaint (N, rate (%))	2 nd most frequent chief complaint (N, rate (%))
Inverted papilloma	Nasal obstruction 331 (56.6)	Incidental finding on image 50 (8.5)
Antrochoanal polyp	Nasal obstruction 273 (78.2)	Rhinorrhea 28 (8.0)
Organizing hematoma	Nasal obstruction 44 (41.5)	Epistaxis 20 (24.4)
Nasolabial cyst	Nasal mass 37 (43.0)	Facial swelling 14 (16.3)
Lobular capillary hemangioma	Epistaxis 29 (42.0)	Nasal obstruction 22 (31.9)
Juvenile nasopharyngeal angiofibroma	Nasal obstruction 24 (80.0)	Epistaxis 6 (20.0)
Schwannoma	Nasal obstruction 4 (25.0)	Incidental finding on image 2 (12.5)
Osteoma	Nasal obstruction 19 (35.2)	Headache 10 (18.5)
Fibrous dysplasia	Incidental finding on image 8 (27.6)	Nasal obstruction 6 (20.7)

Figure 1. Numbers of the cases of the benign sinonasal mass lesions.



IP; inverted papilloma, ACP; antrochoanal polyp, LCH; lobular capillary hemangioma, JNA; juvenile nasopharyngeal angiofibroma

Figure 2. Proportion of chief complaint of the patients of the benign sinonasal mass lesions.

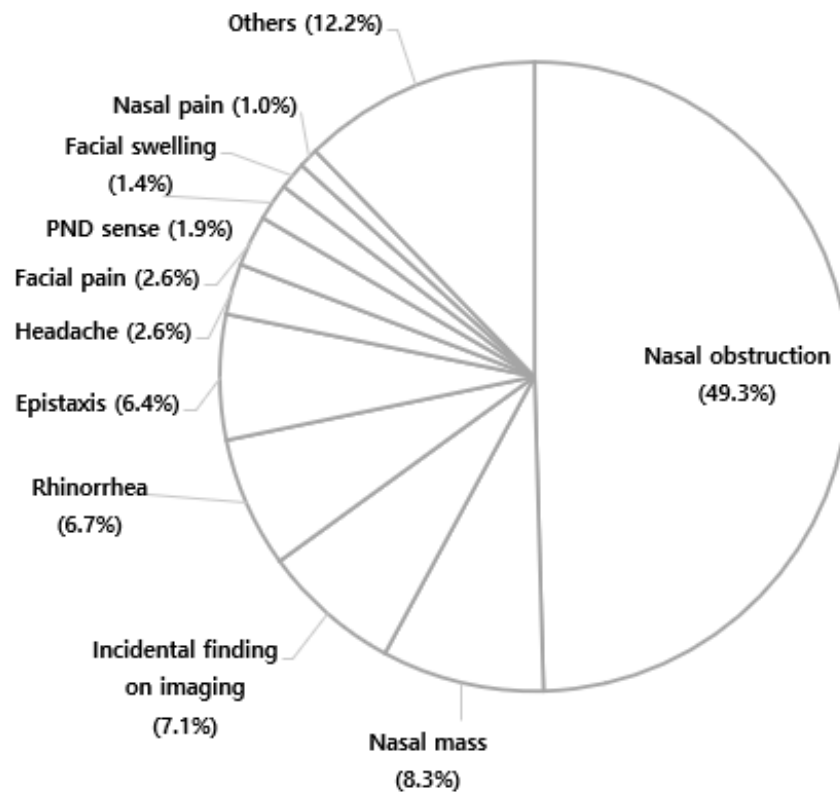


Figure 3. Proportion of three groups of different surgical approach divided by chronological timeline.

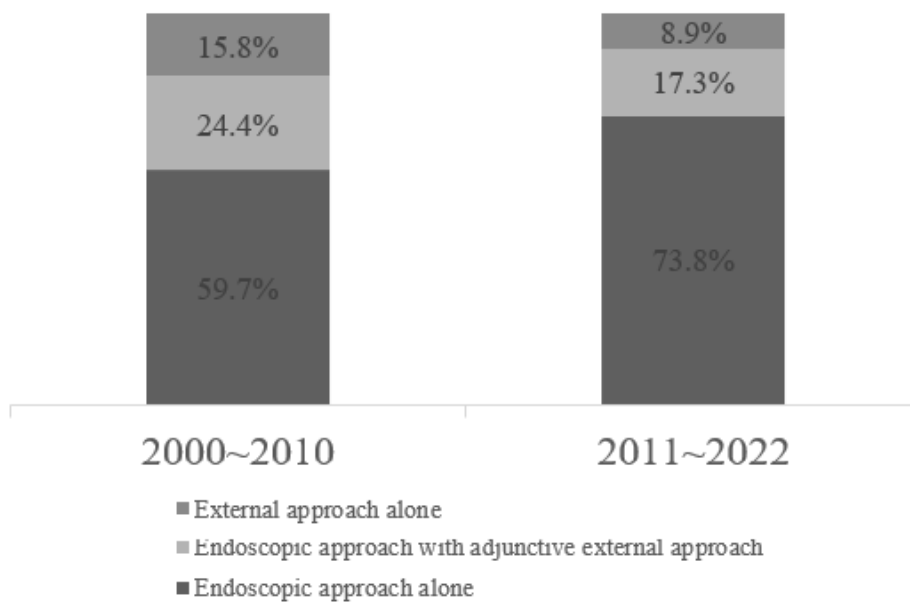
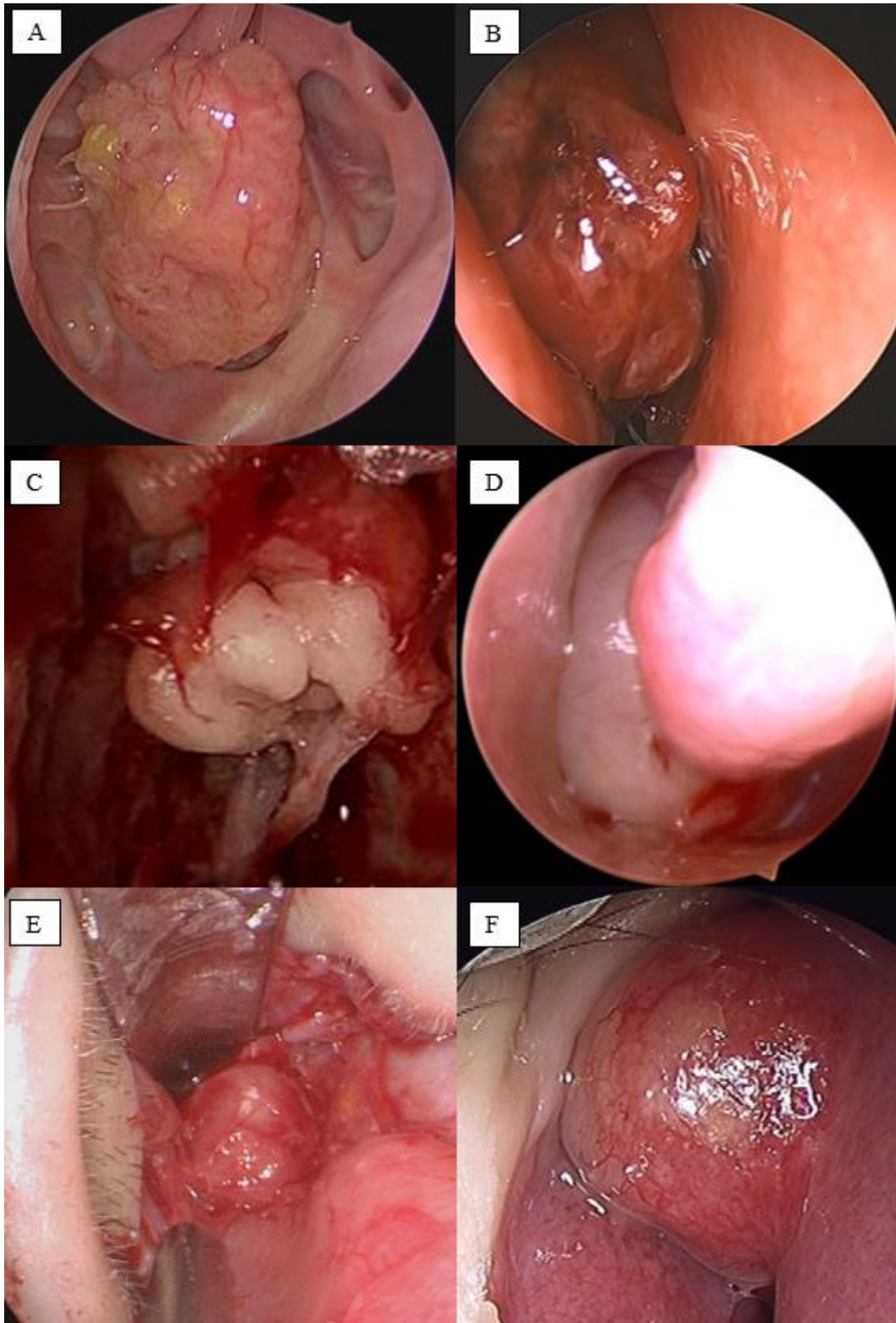


Figure 4. Endoscopic findings of benign sinonasal mass lesions.



(A) Inverted papilloma in sphenoid sinus. (B) Lobular capillary hemangioma in right nasal cavity. (C) Osteoma in frontal sinus. (D) Schwannoma in left posterior septum. (E) Angioleiomyoma in right dorsum SMAS layer. (F) Pleomorphic adenoma arising from right septum.

REFERENCES

1. Melroy CT, and Senior BA, Benign sinonasal neoplasms: A focus on inverting papilloma. *Otolaryngol Clin North Am* 39:601–617, 2006.
2. Kuhn UM, Mann WJ. Endonasal approach for nasal and paranasal sinus tumor removal. *ORL* 2001;36:366-71.
3. Pasquini E, Sciarretta V, Frank G, Cantaroni C, Modugno GC, Mazza tenta D, et al. Endoscopic treatment of benign tumors of the nose and pranasal sinuses. *Otolaryngol Head Neck Surg* 2004;131:180-6.
4. Kim YJ, Han KW, Chung YS, Jang YJ, Lee BJ. Clinical characteristics and treatment outcome of benign tumors of the nose and paranasal sinuses: Experiences of past 13 years in Asan Medical Center. *Korean J Otolaryngol* 2004;47:243-7.
5. Lawson W, Kaufman MR, Biller HF. Treatment outcomes in the management of inverted papilloma: An analysis of 160 cases. *Laryngoscope* 2003;113:1548-56.
6. Holzmann D, Hegyi I, Rajan GP, Ruckstuhl MH. Management of be nign inverted sinonasal papilloma avoiding external approaches. *J Laryngol Otol* 2007;121:548-54.
7. Buchwald C, Larsen AS. Endoscopic surgery of inverted papilloma under image guidance-A prospective study of 2 consecutive cases at a Danish university clinic. *Otolaryngol Head Neck Surg* 2005;132: 602-7.
8. Mendenhall WM, Hinerman RW, Malyapa RS, Werning JW, Amdur RJ, Villaret DB.

Inverted papilloma of the nasal cavity and paranasal sinuses. *Am J Clin Oncol* 2007;30:560-3.

9. Ji Hyeon Shin et al. The Usefulness of Endoscopic Management in Benign Sinonasal Tumors. *J Rhinol* 16(1), 2009.

10. Cuisia ZES, Brannon RB. Peripheral ossifying fibroma—a clinical evaluation of 134 pediatric cases. *Pediatric Dentistry*. 2001;23(3):245–248.

11. BJ Lee et al. Endonasal Endoscopic Removal of Nasopharyngeal Angiofibroma: Comparison with Conventional Surgery. *Korean Journal of Otorhinolaryngology-Head and Neck Surgery* 2005;48(8): 986-990.

12. Schramm VL, Efferon MZ. Nasal polyps in children. *Laryngoscope* 1980;90:1488-95.

13. Krouse JH. Endoscopic treatment of inverted papilloma: safety and efficacy. *Am J Otolaryngol* 2001;22(2):87–99.

14. Lee JT, Bhuta S, Lufkin R, et al. Isolated inverting papilloma of the sphenoid sinus. *Laryngoscope* 2003;113:41–4.

15. Lee J, Chen Y, Kim H, Lustig L, Akintoye S, Collins M, Kaban L. Clinical guidelines for the management of craniofacial fibrous dysplasia. 2012;24(Suppl 1) F.E. S2(7): p. Suppl 1:S2.

16. Cox VS, Rimell FL, Marenttete LJ, and Ness JA. Ethmoidal cemento-ossifying fibroma: the transglabellar/subcranial approach. *Otolaryngol Head Neck Surg* Feb:335–338, 1996.

17. Vaidya AM, Chow JM, Goldberg K, and Stankiewicz JA. Juvenile aggressive ossifying

fibroma presenting as an ethmoid sinus mucocele. *Otolaryngol Head Neck Surg* Dec:665–668, 1998.

18. Song HM, Jang YJ, Chung YS, Lee BJ. Organizing hematoma of the maxillary sinus. *Otolaryngol Head Neck Surg* 2007;136(4):616-20.

19. Dublin AB, Dedo HH, Bridger WH. Intranasal schwannoma: magnetic resonance and computed tomography appearance. *Am J Otolaryngol*. 1995;16:251–254.

20. Kim YS, Kim HJ, Kim CH, Kim J. CT and MR imaging findings of sinonasal schwannoma: a review of 12 cases. *AJNR Am J Neuroradiol*. 2013;34(3):628–633.

21. Su Jin Lim, Yong Kyun Park, and Hyun Jik Kim. A Case of Angioleiomyoma of Nasal Septum. *Korean J Otorhinolaryngol-Head Neck Surg* 2014;57(5):337-9.

22. Scott D. London, Rodney J. Schlosser, Charles W. Gross. Endoscopic Management of Benign Sinonasal Tumors: A Decade of Experience. *American Journal of Rhinology* 16, 221–227, 2002.

영문 요약

Background

The benign sinonasal mass lesions are rare medical conditions. Therefore, to date, Research on benign sinonasal tumors has often been conducted on a disease-specific basis and there has been no large-scale data review regarding benign sinonasal tumors conducted at a single medical center. Therefore, this study aimed to investigate the outcomes of surgical treatment for benign sinonasal mass lesions and the surgical approaches used over an extended period at a single institution, involving a significant number of patients with such tumors.

Methods

We conducted a retrospective review of all available medical records for 1604 patients with benign sinonasal mass lesions who underwent surgery at our medical center between 2000 and 2022. Cases of malignancy and simple polyps were excluded from the study. Demographics, clinical presentations, pathological reports, radiological findings, operative records, and outcomes were collected and analyzed using descriptive statistics.

Results

The data of 1604 patients were reviewed (mean age, 43.6 years). There were 88 different pathologic types of benign tumorous conditions identified. Inverted papilloma (n= 585,

36.4%) was the most common, followed by antrochoanal polyp (n=349, 21.7%). Moreover, 88 (5.5%), and 52 patients (3.2%) experienced recurrence and developed a residual disease postoperatively, respectively. In cases of antrochoanal polyp and juvenile nasopharyngeal angiofibroma, the average ages at diagnosis were 24.2 and 6.5 years, respectively. The most common chief complaint was nasal obstruction (56.6%), followed by nasal mass (8.3%), and incidental lesions on imaging (7.1%). When dividing the study period into before and after 2011, the endoscopic approach alone group increased from 59.7% to 73.8%.

Conclusion

The benign sinonasal mass lesion arises from various pathological conditions. The most common pathology was inverted papilloma. The overall recurrence rate for all cases was 5.5%. In most cases, nasal obstruction was the predominant presenting symptom, but some tumors manifested with symptoms, such as epistaxis, nasal mass, and facial edema. The frequency of endoscopic surgery for benign sinonasal mass lesions has increased compared to that in the past. These results may help in diagnosis and management of benign sinonasal mass lesions.