

Original Article

## COMPREHENSIVE CLINICOPATHOLOGICAL ANALYSIS OF SINONASAL MASSES: A PROSPECTIVE STUDY OF 100 CASES

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### ABSTRACT

**Objective:** Sinonasal masses range from benign inflammatory polyps to malignant tumors, often presenting with overlapping clinical features. Accurate diagnosis is essential for effective management and improved patient outcomes. This study aims to evaluate the clinicopathological profile of sinonasal masses in a tertiary care center, emphasizing the correlation between clinical and histopathological diagnoses.

**Methods:** A prospective study was conducted on 100 patients with sinonasal masses at the Department of Otorhinolaryngology, Osmania Medical College, Hyderabad, over one year. Detailed histories, thorough clinical examinations-including anterior and posterior rhinoscopy-and diagnostic nasal endoscopies were performed. Imaging studies and histopathological examinations were also conducted. Masses were categorized into non-neoplastic and neoplastic types based on histopathology. Data were analyzed for age and sex distribution, clinical presentation, and diagnostic discrepancies.

**Results:** Out of 100 patients, 58% were male and 42% were female, with the highest incidence in the 31–40 y age group (19%). Non-neoplastic masses accounted for 51% of cases, while neoplastic masses comprised 49%, including 38% benign and 11% malignant tumors. Ethmoidal polyps (22%) and antrochoanal polyps (18%) were the most common non-neoplastic lesions. Capillary hemangioma (12%) was the most frequent benign neoplasm, followed by inverted papilloma (10%). Squamous cell carcinoma (7%) was the predominant malignant tumor. Nasal obstruction was the most common symptom (92%), predominantly unilateral (62%). Discrepancies between clinical and histopathological diagnoses were noted in cases of inverted papilloma and squamous cell carcinoma.

**Conclusion:** Sinonasal masses present a diverse range of pathologies with overlapping clinical features, highlighting the necessity of histopathological examination for accurate diagnosis. Correlating clinical findings with histopathology is crucial for early detection and optimal management, especially in malignant cases.

**Keywords:** Sinonasal masses, Clinical diagnosis, Histopathological correlation, Nasal polyps, Neoplastic lesions

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### INTRODUCTION

Sinonasal masses are common entities encountered in otorhinolaryngology, encompassing a wide spectrum from benign inflammatory lesions to aggressive malignant tumors [1]. Patients typically present with nasal obstruction, which may be unilateral or bilateral, along with other symptoms such as nasal discharge, epistaxis, facial swelling, proptosis, diplopia, and visual disturbances [2, 3]. Among these, nasal polyps are the most frequent benign lesions causing nasal obstruction and can significantly impair a patient's quality of life [4].

Differentiating between various sinonasal masses poses a diagnostic challenge due to overlapping clinical presentations and radiological features [5]. Imaging modalities like computed tomography (CT) and magnetic resonance imaging (MRI) provide valuable information regarding the extent and nature of the lesion but are often insufficient for definitive diagnosis [6]. Histopathological examination remains the gold standard for accurate identification, enabling clinicians to distinguish between benign and malignant conditions and to formulate appropriate management strategies [7].

Several studies have emphasized the importance of clinicopathological correlation in the evaluation of sinonasal masses. For instance, Lathi *et al.* reported that histopathological examination is essential for the definitive diagnosis of these masses, given the limitations of clinical and radiological assessments [8]. Similarly, Bakari *et al.* highlighted the diverse histopathological spectrum of sinonasal lesions in their study, underscoring the need for meticulous evaluation [9].

Understanding the demographic patterns, clinical presentations, and histopathological characteristics of sinonasal masses is crucial for

otorhinolaryngologists. It aids in early detection, accurate diagnosis, and effective treatment planning, ultimately improving patient outcomes [10]. This study aims to investigate the spectrum of sinonasal masses in a tertiary care hospital, emphasizing the correlation between clinical findings and histopathological diagnoses, as well as analyzing potential age and gender variations.

### MATERIALS AND METHODS

#### Study design and population

A prospective study was conducted on 100 patients presenting with sinonasal masses at the ENT Outpatient Department of Osmania Medical College, Hyderabad, during the year 2019. Ethical approval was obtained from the institutional review board, and informed consent was secured from all participants.

#### Inclusion and exclusion criteria

• **Inclusion criteria:** Patients of all ages and both sexes presenting with clinically detectable sinonasal masses.

• **Exclusion criteria:** Patients with simple rhinitis or allergic rhinitis without any detectable mass.

#### Clinical evaluation

A comprehensive history was taken for each patient, focusing on symptoms like nasal obstruction, nasal discharge, epistaxis, loss of smell, facial deformity, and other associated complaints. Clinical examinations included:

• **Anterior and posterior rhinoscopy:** To visualize the nasal cavity and nasopharynx.

• **Palpation with probe:** To assess the consistency and mobility of the mass.

• **Neck examination:** To check for lymphadenopathy or other masses.

#### Diagnostic procedures

• **Imaging studies:** All patients underwent computed tomography (CT) scans of the nose and paranasal sinuses to evaluate the extent of the disease and detect any bony erosions.

• **Diagnostic nasal endoscopy:** Using a zero-degree endoscope to precisely locate and assess the origin and extent of the masses.

• **Histopathological examination:** Biopsy specimens were obtained through incisional biopsy or surgical excision. Specimens were fixed in formalin, processed, and stained with hematoxylin and eosin for microscopic examination.

#### Data analysis

Patients were categorized based on age and sex. Sinonasal masses were classified into non-neoplastic and neoplastic (benign and

malignant) types based on histopathological findings. Data were analyzed to determine:

- Age and sex distribution.
- Clinical presentations and symptoms.
- Side of involvement (right, left, or bilateral).
- Correlation between clinical and histopathological diagnoses.
- Discrepancies between pre-operative clinical and final histopathological diagnoses.

#### RESULTS

##### Demographic data

Out of 100 patients, 58 were male (58%) and 42 were female (42%), yielding a male-to-female ratio of approximately 1.38:1. The age distribution ranged from 5 to 70 y, with the highest incidence in the 31–40 y age group (19%), followed by the 21–30 y age group (18%). The least number of patients (5%) were in the 1–10 y age group (table 1).

**Table 1: Age and gender distribution of patients**

Age group (Years)	Male	Female	Total	Percentage (%)
1–10	4	1	5	5.0
11–20	7	9	16	16.0
21–30	10	8	18	18.0
31–40	10	9	19	19.0
41–50	11	6	17	17.0
51–60	10	6	16	16.0
61–70	6	3	9	9.0
Total	58	42	100	100

**Table 2: Gender-wise distribution of sinonasal masses**

Disease	Male	Female	Total
Non-neoplastic			
Antrochoanal Polyp	5	13	18
Sphenchoanal Polyp	0	1	1
Ethmoidal Polyp	12	10	22
Maxillary Mucocele	1	0	1
Hamartoma	1	4	5
Pyogenic Granuloma	1	1	2
Wegener's Granulomatosis	1	1	2
Total non-neoplastic	21	30	51
Benign neoplastic			
Capillary Hemangioma	6	6	12
Cavernous Hemangioma	2	0	2
Inverted Papilloma	8	2	10
Juvenile Angiofibroma	7	0	7
Schwannoma	0	1	1
Fibrous Dysplasia	2	1	3
Olfactory Neuroblastoma	2	0	2
Chondromyxoid Fibroma	1	0	1
Total benign neoplastic	28	10	38
Malignant neoplastic			
Squamous Cell Carcinoma	5	2	7
Adenocarcinoma	1	0	1
Spindle Cell Carcinoma	1	0	1
Chondrosarcoma	1	0	1
Salivary Duct Carcinoma	1	0	1
Total malignant neoplastic	9	2	11
Grand total	58	42	100

#### Distribution of patients based on age groups

Depicting the age-wise distribution of patients.

#### Distribution of sinonasal masses

Out of the 100 patients:

- **Non-neoplastic masses (51%)**
  - Ethmoidal polyps: 22%

- Antrochoanal polyps: 18%
- Others (hamartoma, pyogenic granuloma, Wegener's granulomatosis): 11%

- **Neoplastic masses (49%)**

- **Benign neoplasms (38%)**

- Capillary hemangioma: 12%
- Inverted papilloma: 10%

- Juvenile nasopharyngeal angiofibroma: 7%
  - Others (schwannoma, fibrous dysplasia, olfactory neuroblastoma): 9%
  - **Malignant neoplasms (11%)**
  - Squamous cell carcinoma: 7%
- Others (adenocarcinoma, spindle cell carcinoma, chondrosarcoma, salivary duct carcinoma): 4%
- Side of involvement**
- **Unilateral masses:** 85% of cases
  - Right side: 39%
  - Left side: 46%
  - **Bilateral masses:** 15% of cases, primarily ethmoidal polyps
- Clinical presentation**
- **Nasal obstruction:** Observed in 92% of patients
  - Unilateral: 62%
  - Bilateral: 31%
  - **Other symptoms**
  - Nasal discharge: 29%
  - Loss of smell: 24%
  - Epistaxis: 21%
  - Mouth breathing: 20%
  - Sneezing: 16%
  - Headache: 11%
  - Ear pain: 10%
  - Sore throat: 5%
  - Double vision: 3%
  - Watering from eyes: 2%

Table 3: Side-wise distribution of sinonasal masses

Disease	Right	Left	Bilateral
Non-neoplastic			
Antrochoanal Polyp	5	13	0
Sphenchoanal Polyp	0	1	0
Ethmoidal Polyp	4	4	14
Maxillary Mucocele	0	1	0
Hamartoma	2	2	1
Pyogenic Granuloma	0	2	0
Wegener's Granulomatosis	0	2	0
Benign Neoplastic			
Capillary Hemangioma	6	6	0
Cavernous Hemangioma	2	0	0
Inverted Papilloma	4	6	0
Juvenile Angiofibroma	4	3	0
Schwannoma	1	0	0
Fibrous Dysplasia	2	1	0
Olfactory Neuroblastoma	1	1	0
Chondromyxoid Fibroma	1	0	0
Malignant neoplastic			
Squamous Cell Carcinoma	5	2	0
Adenocarcinoma	1	0	0
Spindle Cell Carcinoma	0	1	0
Chondrosarcoma	1	0	0
Salivary Duct Carcinoma	0	1	0
Total	39	46	15

Table 4: Percentage of patients with each symptom

Symptom	Percentage (%)
Nasal obstruction	92
Unilateral obstruction	62
Bilateral obstruction	31
Nasal discharge	29
Loss of smell	24
Epistaxis	21
Mouth breathing	20
Sneezing	16
Headache	11
Ear pain	10
Sore throat	5
Double vision	3
Watering from eyes	2

**Correlation between clinical and histopathological diagnosis**

Discrepancies were noted between pre-operative clinical diagnoses and final histopathological findings:

- **Inverted papilloma**

- Clinical diagnosis: 10 cases

- Histopathological diagnosis as squamous cell carcinoma: 1 case (10% discrepancy)

- **Juvenile nasopharyngeal angiofibroma**

- Clinical diagnosis: 8 cases

- Histopathological diagnosis as lymphoma: 1 case (12.5% discrepancy)

- Squamous cell carcinoma

- Clinical diagnosis: 7 cases
- Histopathological diagnosis as inverted papilloma: 1 case (14.3% discrepancy)

- Ethmoidal polyp

- Clinical diagnosis: 24 cases
- Histopathological diagnosis as hamartoma: 2 cases (8.3% discrepancy)

**Table 5: Discrepancy between clinical and histopathological diagnoses**

Clinical diagnosis (No. of Patients)	Histopathological diagnosis (No. of Patients)	Discrepancy (%)
Inverted Papilloma (10)	Squamous Cell Carcinoma (1)	10.0
Juvenile Angiofibroma (8)	Lymphoma (1)	12.5
Squamous Cell Carcinoma (7)	Inverted Papilloma (1)	14.3
Ethmoidal Polyp (24)	Hamartoma (2)	8.3

## DISCUSSION

### Demographics and clinical features

Sinonasal masses affect a wide age range, but in this study, the most frequently affected age group was 31–40 y, with a mean age of 34.86 y. Males were more commonly affected than females, consistent with findings by Lathi *et al.* [8]. The male predominance may be attributed to higher exposure to risk factors such as smoking and occupational hazards [1]. Nasal obstruction was the most common symptom, emphasizing the need for careful evaluation of patients presenting with this complaint. The majority of masses were unilateral, aligning with the findings of Bakari *et al.* [9], although some studies, like that of Lathi *et al.* [8], reported more bilateral cases.

### Non-neoplastic lesions

Non-neoplastic lesions constituted 51% of cases in our study, with nasal polyps being the most common. Ethmoidal polyps were more prevalent in males and tended to be bilateral, whereas antrochoanal polyps were more common in females and predominantly unilateral on the left side. These findings are similar to those reported by Pradhananga *et al.* [2] but contrast with Bakari *et al.* [9], who found ethmoidal polyps more common in females. The variability in prevalence could be due to geographical and environmental factors influencing the development of nasal polyps [4].

### Benign neoplastic lesions

Capillary hemangioma was the most frequent benign neoplasm, occurring equally in males and females. All cases arose from the cartilaginous portion of the nasal septum. Inverted papillomas exhibited a male predominance and are notable for their potential for malignant transformation, occurring in up to 11% of cases [11]. This underscores the importance of histopathological examination, even for lesions that appear benign clinically. Juvenile nasopharyngeal angiofibroma was observed exclusively in males, consistent with its known predilection for adolescent males due to hormonal influences [12].

### Malignant neoplastic lesions

Malignant lesions accounted for 11% of cases, with squamous cell carcinoma being the most common. The mean age of presentation was 53.63 y, and there was a male predominance. These findings align with other studies reporting squamous cell carcinoma as the most frequent sinonasal malignancy in older adults [5, 13]. Risk factors such as tobacco use and occupational exposures to wood dust and chemicals may contribute to the development of sinonasal malignancies [14].

### Diagnostic challenges and discrepancies

The study revealed discrepancies between clinical and histopathological diagnoses, particularly in cases of inverted papilloma and squamous cell carcinoma. Inverted papillomas can mimic squamous cell carcinoma clinically and radiologically, leading to misdiagnosis [15]. Similarly, juvenile angiofibroma was misdiagnosed as lymphoma in one case. These discrepancies highlight the limitations of relying solely on clinical and radiological assessments. Histopathological examination remains indispensable for accurate diagnosis and appropriate management [6].

### Clinical implications

The overlapping symptoms of benign and malignant sinonasal masses necessitate a high index of suspicion and thorough diagnostic workup. Early and accurate diagnosis is crucial for optimal patient outcomes, especially in malignant cases where delayed treatment can significantly impact prognosis [7]. Multidisciplinary collaboration involving otorhinolaryngologists, radiologists, and pathologists is essential for effective management [14].

### CONCLUSION

Sinonasal masses present a diverse range of pathologies with overlapping clinical features, making accurate diagnosis challenging. This study emphasizes the necessity of histopathological examination to confirm diagnoses and guide appropriate management. Correlating clinical findings with histopathology is crucial for early detection and optimal treatment, particularly in malignant cases where timely intervention is critical.

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### AUTHORS CONTRIBUTIONS

All authors have contributed equally

### CONFLICT OF INTERESTS

Declared none

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