

## Clinical, radiological and histopathological profile of sinonasal masses: An observational study at a tertiary care centre in Uttarakhand

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### Abstract

**Introduction:** Sinonasal masses are commonly encountered in clinical practice of Otorhinolaryngology. These masses are sometimes difficult to be differentiated from each other due to their similar clinical presentation and their radiological features also create confusion. Histopathology plays a key role in differentiating these masses from each other. The aim of present study was to study the clinical presentation, radiological characteristics and histopathological findings of some commonly occurring sinonasal masses. **Materials and methods:** This observational cross sectional study comprising of 60 patients was done in Government Medical College, Haldwani and associated Dr Susheela Tiwari Government Hospital between the periods of January 2019 to September 2020. All patients (18 years and above) presenting with complaints suggestive of sinonasal masses were included in this study after taking due consent. These cases were subjected to thorough history taking and clinical examination, routine hematological and biochemical evaluation, nasal endoscopy, CT scan of nose and paranasal sinuses/ MRI (where required) and biopsy. Final diagnosis was made after histopathological examination. **Observations and results:** 60 cases were studied out of which 40(66.66%) cases were males and 20(33.33%) were females with a male to female ratio of 2:1. Maximum cases was recorded in the third decade of life with 17(28.33%) patients. Nasal obstruction was the most common complaint. (54patients (90%) In 49 (81.66%) cases radiology indicated involvement of more than one region of the sinonasal tract. Histopathology proved (70%) of the total cases ie.42 to be non neoplastic and rest (18 (30%) neoplastic. Benign neoplastic masses were 14(23.33%) and malignant masses were 4(6.66%) of the total cases. Inflammatory nasal polyps were the most common non neoplastic lesions. In case of neoplastic variety, inverted papilloma and capillary hemangioma were the most common benign lesions. Squamous cell carcinoma was the most common malignant lesion. **Conclusion:** Histopathological examination is mandatory for final diagnosis in patients with sinonasal masses. Combined clinical, radiological and histopathological evaluation is necessary to determine the true nature of the sinonasal mass and further management.

**Keywords:** sinonasal masses, neoplastic masses, non neoplastic masses

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### Introduction

A variety of conditions involving the nasal cavity, paranasal sinuses and nasopharynx are commonly encountered in clinical practice. Various antigens, chemicals, infective agents and other influences form the etiology of sinonasal masses. The nasal cavity and the paranasal sinuses form a single functional unit with common pathological process affecting both. All sinonasal masses have similar clinical presentation, i.e., nasal obstruction, rhinorrhoea, blood stained nasal discharge, epistaxis, oral symptoms, facial swelling, orbital symptoms, ear symptoms etc. Sinonasal masses can be divided into neoplastic and non-neoplastic, which in turn can be further divided into benign and malignant.

Malignant sinonasal tumours may resemble a simple nasal mass. It is sometimes difficult to determine the underlying pathology without radiology and histopathology. Therefore, use of nasal endoscopy, radiology and histopathology is done to reach a proper and confirmatory diagnosis. Among radiology computed tomography (CT) and magnetic resonance imaging (MRI) are extremely helpful in reaching a presumptive diagnosis as they can delineate fine anatomical details and extent of the disease[1-8]. Any confusion on histopathology can be further cleared by immunohistochemistry[3]. A detailed history, clinical examination, proper imaging and most importantly a thorough histopathological evaluation are essential part of work up of the patient.

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All these modalities are required for timely intervention of sinonasal masses.

### Materials and methods

All adult (18 years and above) patients attending the department of Otorhinolaryngology & Head and Neck Surgery at DrSusheela Tiwari Government Hospital for the treatment of sinonasal mass in the period of January 2019 to September 2020 were considered for our study. History was taken and detailed clinical examination was done on the patients based on a prestructured proforma. The patients were then subjected to Diagnostic Nasal Endoscopy in OPD under standard conditions. Radiological investigation was done in the form of computed tomography scan (CT) scan nose and paranasal sinuses (PNS) by utilizing three sections i.e. coronal, axial and sagittal. In majority of patients non contrast CT was done while few required contrast enhanced computed Tomography (CECT). MRI of nose and PNS was done in few cases. All patients were operated under local / general anesthesia as required after taking due informed consent. The excised tissue was sent for histopathological examination and the report was considered to be the final and definitive diagnosis.

### Observations and results

The study comprising of 60 patients was conducted in the Otorhinolaryngology & Head and Neck Surgery, Radiodiagnosis and Pathology departments at Government Medical College, Haldwani, from January 2019 to September 2020.

Gender distribution

60 cases were studied out of which 40(66.66%) cases were males and 20(33.33%) cases were females with a male to female ratio of 2:1 as shown in figure 1.

**Figure 1- Pie chart showing gender distribution of study subjects**

**Age distribution**

In this study the age ranged from 18 to 77 years, the maximum patients were seen in third decade of life i.e. 17 (28.33%) as shown in figure 2.

**Figure 2- Bar chart showing age distribution in study subjects**

**Symptoms and signs**

Majority of the patients presented with more than one symptom and nasal blockage was the commonest complaint noted in 54 patients (90%), followed by nasal discharge (26.66%). Other complaints include headache, bleeding from nose, decreased sensation of smell, sensation of mass in nose, facial pain, facial swelling, sneezing, watering from eye, earache and blocking sensation in ears. The frequency of symptoms is shown in figure 3.

**Figure 3- Bar chart showing frequency of symptoms in study subjects.**

Most of the patients i.e. 38 out of 60(63.33%) had bilateral nasal mass while rest i.e. 22 (36.66%) had unilateral mass. Out of the 22 patients with unilateral mass, 16 patients had mass on left side and 6 patients had mass on the right side.

**Radiological evaluation and findings**

Out of 60 patients, CT scan was done in 54 patients while in 6 patients CT scan as well as MRI both was required. Regarding radiological findings, majority of the patients ( 49 cases (81.66%),

demonstrated radiological abnormalities in more than one region of the sinonasal tract (SNT). In 5 cases (8.33%) mass was localized to nasal cavity. In 4 cases (6.66%) mass was seen in middle meatus and maxillary sinus only. In 4 cases (6.66 %) the mass extended out of sinonasal tract. The extension of sinonasal masses on radiological imaging is shown in figure 4.

**Figure 4- Pie chart showing extension of mass on radiological imaging**

**Histopathological finding**

On the basis of histopathological study, 70% (42) of the total cases were found to be non neoplastic and rest i.e.18 (30%) were neoplastic. Benign neoplastic masses were 14(23.33%) and 4(6.66%) were malignant masses.

**Non neoplastic lesions**

In non neoplastic category polypoidal nasal masses were most commonly seen which were found to be inflammatory nasal polyps on histopathology (42 cases). Out of these 42 cases a total number of 38 inflammatory polyps were bilateral and 4 were unilateral.

**Neoplastic lesions**

In neoplastic lesions 14 cases (23.33%) were benign and 4 cases (6.66%) were malignant.

Benign lesions comprised of four cases of inverted papilloma and lobular capillary hemangioma each. There were two cases of angiomatous nasal polyp and angiofibroma which was confirmed on histopathology. One case each of fibroepithelial polyp and squamous papilloma was reported as shown in table 1.

**Table 1- Showing various benign neoplastic lesions**

S.N.	Benign lesion	Number of cases
1	Fibroepithelial polyp	1
2	Inverted papilloma	4
3	Angiomatous polyp	2
4	Lobular capillary hemangioma	4
5	Angiofibroma	2
6	Squamous papilloma	1

Malignant lesions- 4 cases of squamous cell carcinoma were reported in the study.

**Histopathology results in various age groups**

Considering all sinonasal masses, the third decade of life was the most affected with 17 cases (28.33 %) followed by the second decade with 14 cases (23.33%). Only 1 patient (1.66 %) presented in the eighth decade as shown in table 2.

**Table 2- Showing histopathological results in various age groups**

Age group(years)	Non neoplasm (No. of cases)	Benign neoplasm (No. of cases)	Malignant neoplasm (No. of cases)	Total number
11-20	11	3	-	14(23.33%)
21-30	14	3	-	17(28.33%)
31-40	7	4	-	11(18.33%)
41-50	4	2	-	6(10%)
51-60	2	2	2	6(10%)
61-70	3	-	2	5(8.33%)
71-80	1	-	-	1(1.66%)
Total number	42(70%)	14(23.33%)	4(6.66%)	60(100%)

**Non neoplastic lesions according to age group**

Among non neoplastic lesions, inflammatory polyps (42 cases) were seen. Inflammatory polyps were most common in third decade with 14 cases and in second decade with 11 cases. Ethmoidal polyps were commonest in the third decade (14 cases) followed by second decade with 9 cases. In fourth decade 6 cases were seen, 4 cases were seen in fifth decade, 2 cases in sixth decade and 3 cases were seen in seventh decade. Males (28 cases) were affected more than females (10 cases). Antrochoanal polyps were common in second decade (2 cases) followed by one case each in fourth and eighth decade. Males (3 cases) were affected more than females (1 case).

**Neoplastic lesions according to age group**

The most common benign neoplastic masses found were lobular capillary hemangioma (4 cases) and inverted papilloma (4 cases). Capillary hemangioma was seen in females more commonly in the third decade while inverted papilloma was seen equally in males and females of the fourth, fifth and sixth decades. Among malignant tumors, squamous cell carcinoma was seen (4 patients) and was prevalent in the sixth (2 cases) and seventh (2 cases) decades, followed by fifth and sixth decades (1 patient each) with a male female sex ratio of 3:1. Other types seen in decreasing order: Angiofibroma (2 cases) in males of second decade, angiomatous polyp (2 cases) with equal sex

distribution, fibroepithelial polyp (1 case) in male of fourth decade and squamous papilloma (1 case) in male of fourth decade.

Squamous cell carcinoma was poorly differentiated in one case (female of seventh decade) and was moderately differentiated in three cases (males of sixth and seventh decade).

The age and gender distribution of various neoplastic lesions seen in the study is summarized in table 3 and table 4 respectively.

**Table 3- Showing age distribution of neoplastic masses**

Neoplastic lesions	11-20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years	Total number of cases
<b>Benign lesions</b>								
Fibroepithelial polyp	-	-	1	-	-	-	-	1
Inverted papilloma	-	-	1	1	2	-	-	4
Lobular capillary hemangioma	1	2	-	1	-	-	-	4
Angiofibroma	2	-	-	-	-	-	-	2
Angiomatous polyp	-	1	1	-	-	-	-	2
Squamous papilloma	-	-	1	-	-	-	-	1
Total	3	3	4	2	2	-	-	14
<b>Malignant lesions</b>								
Squamous cell carcinoma					2	2		4

**Table 4- showing gender distribution of neoplastic masses**

Neoplastic lesions	No. of males	No. of females	Total number of cases
<b>Benign lesions</b>			
Fibroepithelial polyp	1	-	1
Inverted papilloma	2	2	4
Lobular capillary hemangioma	-	4	4
Squamous papilloma	1	-	1
Angiofibroma	2	-	2
Angiomatous polyp	1	1	2
Total	7	7	14
<b>Malignant lesions</b>			
Squamous cell carcinoma	3	1	4

## Discussion

The age of the patients with sinonasal masses in our study was between 18 to 77 years. Maximum number of cases was noted in the third decade of life. Similar results were reported by Vijay et al (2015) in their study[9]. However this is not similar to most of the studies where majority of the patients presented in their second decade of life. According to a study done in Bangladesh by Humayun A. et al (2010), this was attributed to increased incidence of inflammatory disease in that agegroup[6].

Most studies have reported a male preponderance of sinonasal masses[6,10-12]. In our study male to female ratio was 2:1 which is comparable to study done by Rawat D.S., Chadha V et al (2013) in which a male to female sex ratio of 2.1:1 was seen[10]. In another study done by Bisht SS et al (2012) male to female ratio of 1.8:1 was observed[3].

Nasal obstruction was the most common symptom in patients with sinonasal masses leading them to seek medical consultation. This is similar to findings reported in other studies. In our study nasal obstruction was seen in 54 cases(90%) followed by nasal discharge in 16 cases(26.66%) which is comparable to study by Chatterjee et al in 2014 with nasal obstruction seen in 84.5% cases[13]. Other studies by J. Sivalingam et al (2015)[14], Lathi et al (2011)[15], R. Sharma et al (2017)[16] have shown similar results.

Among 60 nasal masses, 38 cases (63.33%) were bilateral and 22 cases(36.6%) were unilateral in our study which is in contrast to most studies where percentage of unilateral masses is more than bilateral masses[1, 13]. The reason for higher number of bilateral masses can be due to a higher number of patients with allergic and inflammatory diseases in second and third decades of life. In a study by A. Lathi et al preponderance of unilateral masses was seen[15].

Regarding radiological investigation, majority of the patients (54 cases) underwent NCCT scan while some patients required contrast examination. In 6 cases both CT scan and MRI were done. In our study, 43 cases (71.66%) were non neoplastic, 13 cases (21.66%) were benign and 4 cases (6.66%) were malignant on the basis of

radiological investigation. Similar results were seen in a study by Dhilon V. et al (2016) where all 60 patients underwent CT scan. On the basis of radiology, out of 60 patients, 43 patients (71.66%) were nonneoplastic, 10 patients (16.66%) were benign, and 7 patients (11.66%) were malignant[17]. Bisht S.S. et al reported similar findings[3]. In a study by Chopra H (2008) the radiological finding matched with clinical suspicion in 70% of the cases[18].

The majority of sinonasal masses were found to involve more than one region of sinonasal tract on CT scan. This could be due to different sites of origin of sinonasal masses, delay in consultation in some cases, and to rapidly growing lesions like some malignant tumors in others. In studies by A. Lathi et al[15] and Chatterjee et al[13] middle meatus was most commonly involved as can be seen in our study.

Histopathological examination of the sinonasal masses remains the mainstay of diagnosis. In our study out of 60 cases of sinonasal masses 42 cases (70%) were non neoplastic and 18 cases (30%) were neoplastic. Higher number of non neoplastic masses were also observed in other studies[13, 17, 19].

Among non-neoplastic masses, inflammatory nasal polyps were commonly seen, finding similar to those from almost all studies on sinonasal masses. Bakari et al (2010)[2], ST Chettri et al (2013)[7] and SeemaK.Modh et al (2013)[19] have conducted studies with similar findings.

In our study, 14 cases (23.33%) of the neoplastic masses were benign and 4 cases (6.66%) were malignant. Among benign neoplastic lesions, capillary hemangioma and inverted papilloma were most common (4 cases each). All cases of capillary hemangioma were seen in females and inverted papilloma had equal distribution in both sexes. Squamous cell carcinoma was the most common malignant lesion. Studies done by P. Agarwal and R. panigrahi (2017)[20], Sharma et al (2017)[21] have shown similar results. Hemangioma has been found to be most commonly seen benign lesion in most studies. Studies done by Bisht S.S. et al[3], Sivalingam J. et al (2015)[14] have shown squamous cell carcinoma to be the commonest malignant

lesion and maxillary sinus to be most commonly affected in malignancy, as seen in our study.

Non neoplastic lesions were more commonly seen in second and third decade of life and were more common in males. Similar results were also seen in study done by Aparna M. Kulkarni, Vishal G. Mudholkar et al (2015)[12], Banarjee A., Ghosh S.(2017)[22] and Sivalingam J. et al (2015)[15]. Benign neoplastic lesions were seen between second and sixth decade of life. Malignant lesions were seen in sixth and seventh decades of life and were more common in males. These results are similar to studies done by Chatterjee et al (2014)[13] and Sivalingam J. et al (2015)[14].

### Conclusion

Sinonasal masses are more common in males than in females. Among non neoplastic lesions, inflammatory polyps are common mostly seen in second and third decades of life. Benign neoplasms are seen more commonly in <50 years of age with hemangioma and inverted papilloma being the most common benign neoplasms. Squamous cell carcinoma is the most frequent histological type in malignant lesions seen in sixth and seventh decade of life. Nasal obstruction is the most common symptom in sinonasal masses. Imaging is important for the diagnosis of sinonasal masses and to determine extent of disease. Histopathological examination is mandatory for final diagnosis in patients with sinonasal masses. Combined clinical, radiological and histopathological evaluation is necessary to determine the true nature of the sinonasal mass and further management.

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