

A Descriptive Study of Clinical, Radiological, and Histopathological Correlation of Sinonasal Masses

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Abstract

Introduction: The nasal masses are most commonly encountered condition in outpatient department of otorhinolaryngology and to evaluate correlation of clinical, radiological, and histopathological diagnosis of various sinonasal masses.

Materials and Methods: This is a hospital-based, descriptive, observational, and cross-sectional study. Total 92 cases of various sinonasal masses were enrolled in the study. They underwent thorough clinical examination, radiological examination in the form of contrast/non-contrast computed tomography scan as per need and histopathological examination (HPE). All of above are correlated with each other to rule out how accurately they correlate with each other.

Results: Average age of study population was 32.52 ± 14.22 years. Male predominance was there. According to final diagnosis, 65 (70.65%) cases had non-neoplastic lesions, 17 (18.47%) had benign tumors, and 10 (10.86%) had malignant tumors. We correlated histopathological diagnosis with clinical and radiological diagnosis and found that in 84 (91.30%) patients histology correlated with clinical diagnosis and in 8 (8.70%) patients histopathology gave final diagnosis in which clinical diagnosis was inconclusive. Similarly, in 86 (93.48%) patients histopathology correlated with radiological diagnosis and in 6 (6.52%) patients histopathology gave final diagnosis in which radiological diagnosis was inconclusive.

Conclusions: We concluded that despite of being a good accuracy sole clinical and radiological diagnosis is not always be a confirmatory one. In some cases, HPE is of utmost importance to approach the diagnosis which can be a game changer in further management. Hence, whenever a sinonasal mass was surgically removed always sent it for HPE.

Key words: Clinical, Correlation, Histopathology, Radiology, Sinonasal mass

INTRODUCTION

Sinonasal masses are a fairly common clinical entity that occurs amongst patients of all age groups and are encountered routinely in ENT outpatient departments. The reported incidence is 1–4% of the population.^[1] Their presenting features are diverse and depends on the type, spread, and extent of the primary disease. These lesions can be ranged from simple nasal polyps to malignant lesions.^[2]

Sinonasal masses can be divided into two main categories: Non-neoplastic and neoplastic, which, in turn, are further

divided into benign and malignant.^[3] Benign sinonasal masses are common. They have long clinical history with frequent local recurrence and thus relatively significant morbidity.^[4] The prevalence rate of nasal polyp is about 2%. The male:female ratio is about 2:1.^[5] Nasal polyps are the most common cause of nasal obstruction.^[6]

For malignant sinonasal masses, though the presentation may be nonspecific certain physical finding are often suggestive of the disease spectrum, such as cranial neuropathies, facial swelling, and epistaxis. The average delay between the first noticeable symptom and diagnosis is 6 months.^[7]

Presenting complaints of sinonasal masses are quite similar so it is difficult to approach the nature of disease, that is why clinical, radiological, and histopathological assessment play a significant role to supplement the diagnosis.^[8] A complete histopathological examination (HPE) is necessary

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to decide the nature of any particular lesion for final diagnosis and management accordingly.^[9] Clinical features and imaging techniques help us in reaching a provisional diagnosis but HPE remains the main stay for making a final definitive diagnosis.^[10] This study depicts the role of clinical, radiological, and histopathological modalities in diagnosing various sinonasal masses.

MATERIALS AND METHODS

This hospital-based; descriptive, observational, and cross-sectional study was conducted in the Department of Otorhinolaryngology of our institute from June 2018 to December 2019. Total 92 cases attended ENT OPD of our institute with sinonasal masses were included in the study after getting written and informed consent. Those presented with nasal pathology except sinonasal masses, unfit for taking biopsy or for surgery and those who were not willing to participate in the study were excluded from the study.

Patients presented with complaints of nasal obstruction and on anterior rhinoscopy, mass present in nasal cavity were enrolled in the study after confirmation of findings by nasal endoscopy. After applying inclusion and exclusion criteria final sample size achieved. A detailed history was taken with special reference to age, sex, residence, occupation, family history, history, allergic disorders, any addictive habits detailed clinical examination local, and general were made with special reference to nose and paranasal sinuses (PNS). These cases were subjected to routine biochemical and hematological evaluation. Nasal endoscopy, X-ray PNS, computed tomography (CT) scanning non-enhanced/enhanced, magnetic resonance imaging, fine-needle aspiration cytology, and biopsy were conducted. The tissues were routinely processed for histopathological sections of 5 µg thickness and were stained by hematoxylin and eosin stain. Special staining by reticulin, von Giesen, Periodic Acid-Schiff, and Masson’s trichrome were undertaken whenever applicable. Immunohistochemical marker studies were done whenever indicated.

After clinical examination, radiological evaluation and HPE statistical analysis were done. Categorical data summarized in the form of rates and proportions. Continuous summarized in the form of mean and standard deviation. The level of significance kept 95% for all statistical analysis. *P* = 0.05% taken as significant. Data were analyzed using appropriate statistical tests.

RESULTS

In the present study, the mean age of patients was 32.52±14.22 years with sinonasal masses were most prominent at 2nd, 3rd, and 4th decades of life after that

prevalence decreases. There was male predominance with 30 females and 62 males out of 92 patients.

Sixty-five (70.65%) cases had non-neoplastic lesions, 17 (18.47%) had benign tumors, and 10 (10.86%) had malignant tumors. Maximum 22 (33.84%) cases of non-neoplastic lesions were in the age group of 21–30 years. Similarly, maximum 6 (35.29%) cases of benign lesions were seen in 11–20 years age group and the malignant lesions were commonly seen beyond 40 years of age.

The maximum number of non-neoplastic lesions was found to be ethmoidal polyp which was seen in 36 (55.38%) cases, followed by antrochoanal polyp seen in 19 (29.23%) [Figure 1].

In the present study, maximum cases of benign neoplastic lesions to be found were angiofibroma (6/17), followed by hemangioma (3/17). Two cases of inverted papilloma were there, all of them were male. We had one case of ossifying fibroma, two case of nasolabial cyst, one case of squamous papilloma, and one case of ameloblastoma. One case of fibrous dysplasia also encountered. The sex ratio was 3.25:1 [Figure 2].

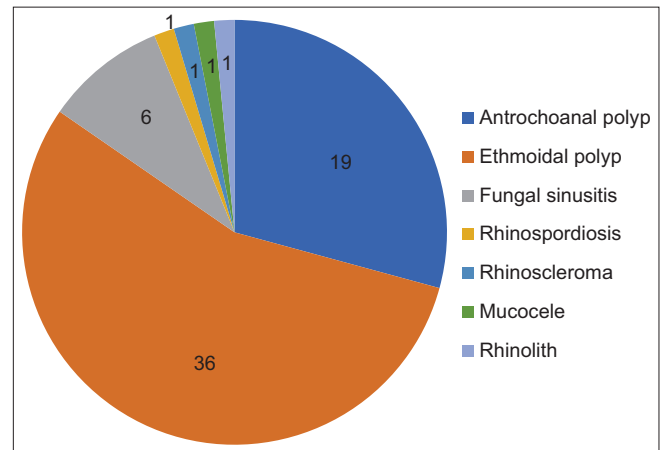


Figure 1: Distribution of non-neoplastic lesions

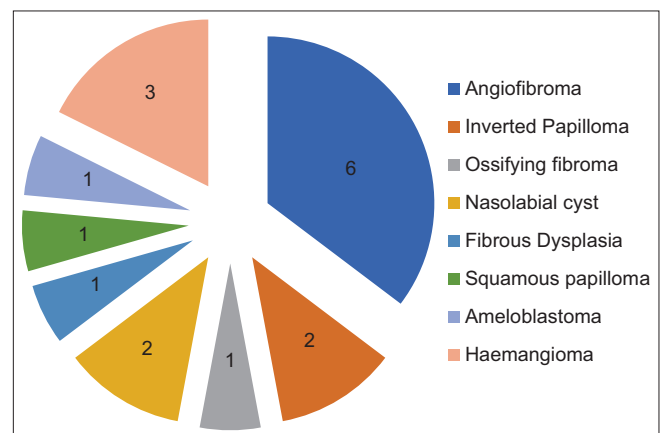


Figure 2: Distribution of benign sinonasal tumors

Squamous cell carcinoma of maxilla was the most common malignant lesion encountered in 4 (40%) out of total ten malignant cases. Other lesions found were adenocarcinoma 2 (20%) and nasopharyngeal carcinomas 2 (20%). We also found one case each of malignant melanoma, esthesioneuroblastoma, and sex ratio was 2.3:1 [Figure 3].

Findings encountered during endoscopy and computerized tomography are shown in Table 1. We also got HPE done and found that nearly 55 patients had inflammatory polyps followed by six patients having angiofibroma [Figure 4].

We correlated histopathological diagnosis with clinical and radiological diagnosis and results obtained are describing in Table 2.

We correlated histopathological diagnosis with clinical diagnosis and radiological diagnosis and found that in 84 patients histology correlated with clinical diagnosis and in eight patient's histopathology gave final diagnosis in which clinical diagnosis was inconclusive. Similarly in 86 patients, histopathology correlated with radiological diagnosis and in six patients histopathology gave final

diagnosis in which radiological diagnosis was inconclusive [Figures 5 and 6].

DISCUSSION

A wide range of lesions is encountered. The incidence is often stated to be between 1% and 4% of the population.^[11] In the present study period, the hospital admission incidence of sinonasal masses was found to be 1.4/1000 admissions in our institute. Sinonasal masses are divided into two major groups, non-neoplastic lesions (inflammatory, polyp, and others) and neoplastic lesions. Neoplastic lesions may be benign or malignant.

Tondon *et al.* in the study of 134 cases presenting with polypoidal lesions in the nasal cavity analyzed that the incidence of inflammatory lesion was 74.61% while those of neoplastic lesions was 25.41%. Among the neoplastic lesions, 73.5% were benign while the malignant were 26.5%.^[12]

Dasgupta *et al.* in the analysis of 345 polypoidal masses in nose and nasal sinuses, revealed 175 (50.7%) non-neoplastic lesions and 170 (49.3%) neoplastic lesions. Among the non-neoplastic lesions, there were 110 cases (62.8%) of true nasal polyps including 74 cases (67.3%) of allergic polyps and 36 (32.7%) inflammatory ones.^[5]

Diamantopoulos *et al.* in their study on 2021 patients revealed that 1830 (90.5%) patients were non-neoplastic and the remaining 181 (8.9%) were of neoplastic origin. In the non- neoplastic cases, 1570 polyps (77.6% of total) were of allergic, inflammatory or infective origin. In the 181 neoplastic cases, 98 (4.8% of total) were benign while 83 (4.1% of total) were with malignant pathology.^[13] Shashin *et al.* reported 193 cases of nasal masses, inflammatory, and tumor such as lesions were 148 (76.68%), benign lesion

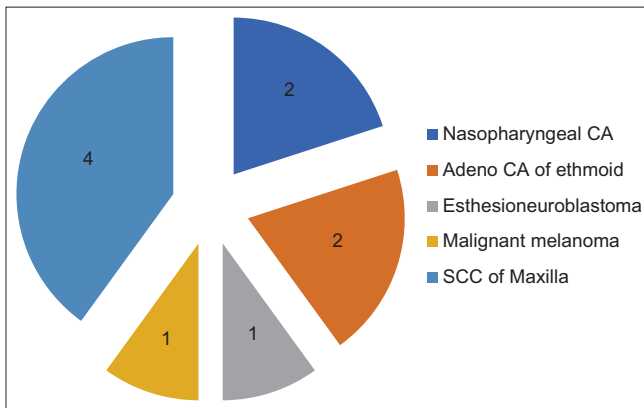


Figure 3: Distribution of malignant sinonasal lesions

Table 1: Nasal endoscopy and computed tomography scan findings of study population

Modality studied	Non-neoplastic lesions	Benign lesions	Malignant lesions
Diagnostic nasal endoscopy			
Unilateral nasal mass	25	17	9
Bilateral nasal mass	40	—	1
Bleeding on touch	2	8	7
Deviated nasal septum	15	3	2
Turbinate hypertrophy	12	2	—
Computed tomography scan			
Unilateral nasal mass	25	17	9
Bilateral nasal mass	40	—	1
Unilateral paranasal sinus mass	21	9	9
Bilateral paranasal sinus mass	40	—	—
Nasopharyngeal mass	21	—	2
Deviated nasal septum	15	3	2
Turbinate hypertrophy	12	2	—
Bone erosion	1	—	7
Neck nodes	—	—	3

Table 2: Correlation of clinical, radiological, and histopathological diagnosis

Clinical diagnosis	n	Radiological diagnosis	n	Histopathological diagnosis	n
Malignant mass	2	Malignant mass	2	Adeno carcinoma	2
sinusitis	3	Allergic fungal sinusitis	3	Allergic fungal sinusitis	3
Maxillary mass	1	Maxillary mass	1	Ameloblastoma	1
Angiofibroma	6	Angiofibroma	6	Angiofibroma	6
Nasal mass	1	Malignant tumor	1	Esthesioneuroblastoma	1
Nasal mass	1	Fibrous dysplasia	1	Fibrous dysplasia	1
Frontal swelling	1	Frontal cystic lesion	1	Frontal mucocele	1
Ethmoid polyp	36	Ethmoid polyp	36	Inflammatory polyp	36
Antrochoanal polyp	19	Antrochoanal polyp	19	Inflammatory polyp	19
Sinusitis	3	Fungal sinusitis	3	Invasive fungal sinusitis	3
Inverted papilloma	2	Inverted papilloma	2	Inverted papilloma	2
Hemangioma	3	Hemangioma	3	Lobular capillary hemangioma	3
Malignant melanoma	1	Septal mass	1	Malignant melanoma	1
Nasolabial cyst	2	Nasolabial cyst	2	Nasolabial cyst	2
Nasal mass	1	Ossifying fibroma	1	Ossifying fibroma	1
Nasal mass	1	Nasal mass	1	Lymphoproliferative disorder	1
Nasal mass	1	Rhinolith	1	Rhinolith	1
Nasal mass	1	Nasal mass	1	Rhinoscleroma	1
Rhinosporidiosis	1	Rhinosporidiosis	1	Rhinosporidiosis	1
Maxillary ca	4	Maxillary ca	4	Squamous cell carcinoma maxilla	4
Nasopharyngeal carcinoma	1	Nasopharyngeal carcinoma	1	Nasopharyngeal squamous cell carcinoma	1
Squamous papilloma	1	Nasal mass	1	Squamous papilloma	1
Total	92	Total	92	Total	92

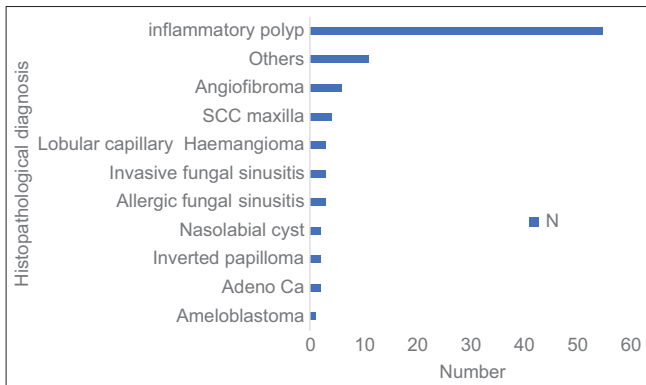


Figure 4: Histopathological findings of study specimen

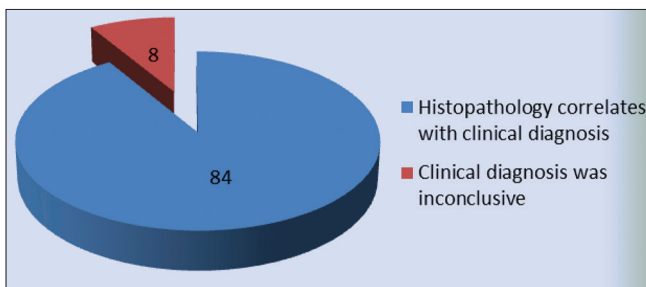


Figure 5: Correlation of clinical and histopathological diagnosis

17 (33.37%), and malignant lesions were 28 (62.28%).^[14] Table 3 is showing comparison of various studies including our study based on nature of sinonasal masses.

Maximum number of cases of inflammatory and tumor such as masses was seen in the age group of 21–30 years.

Shashin *et al.* reported similar findings.^[14] The mean age for benign sinonasal masses was 26 years. We had 17 cases of benign sinonasal lesions. 33.84% of those were of age group of 11–20 years of age. This was due to high number of cases of angiofibromas, a disease affecting adolescent males. Benign lesions are rarely seen above 60 years of age. Our findings closely resembled those of Swamy and Gowda.^[15]

Most of the patients of inflammatory masses presented with nasal obstruction (89%) for 2 months-1 year of duration. Nasal discharge was complained by 72% of the patients. These findings were comparable to that of Shashin *et al.*^[14] Significant number of the patients had ear findings (8.68%) and alteration of smell (18.47%). Commonly complained ear problem was ear ache and common findings were of serous and adhesive otitis media.

Several studies have provided evidence that CT and symptoms do not necessarily correlate. In a study by Bolger, 42% of asymptomatic patients had mucosal changes on CT scan.^[16] In a study, Stankiewicz examined 78 patients meeting chronic rhinosinusitis symptom criteria of which only 47% had evidence of chronic rhinosinusitis on CT.^[17] A prospective study of the patients without chronic rhinosinusitis by Flinn reported that 27% had mucosal changes suggestive of chronic rhinosinusitis.^[18] In a study of 50 patients of nasal polyps by Chopra, the radiological findings matched with clinical suspicion in only 70% cases. The allergic fungal polyps were the most correctly diagnosed radiological condition in their study. This was

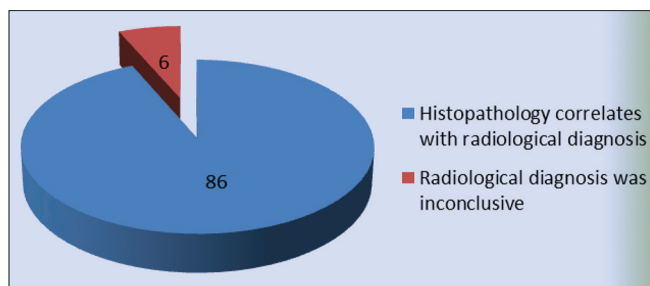


Figure 6: Correlation of radiological and histopathological diagnosis

Table 3: Comparison of distribution of sinonasal masses in various studies based on their nature

Study	No. of cases	Non-neoplastic lesions (%)	Benign tumors (%)	Malignant tumors (%)
Tondon <i>et al.</i>	134	74.61	16.8	8.6
Dasgupta <i>et al.</i>	354	50.7	31.88	17.4
Diamantopoulos <i>et al.</i>	2021	90.5	4.8	4.8
Shashin <i>et al.</i>	193	76.68	8.80	13.47
Khan <i>et al.</i>	240	60	23.33	16.67
Present study	92	70.65	18.47	10.86

due to the high percentage of hyperdense signal in the sinus cavities (caused by calcium salts) detected on CT scan. The diagnosis of non-specific sinonasal polyps, antrochoanal polyp, and mucormycosis was correctly established in most of the cases.^[19] There was a difference of opinion between the clinician and the radiologist in about 20% of non-neoplastic lesions. The correct diagnosis of neoplastic lesions was established in only 22% of cases (two out of nine patients). In most cases, it was inadequate to predict the histological subtype and to differentiate non-neoplastic from neoplastic and benign from malignant lesions. Among 110 cases, nasal polyps were the commonest type of non-neoplastic lesion found in the study conducted by Dasgupta *et al.* in 1997. Allergic nasal polyps were observed in 74 cases and the remaining cases were of inflammatory nasal polyps. There were 64 males and 46 females in the nasal polyp cases. The age range of patients was 8–76 years with a mean of 32.6 years.^[5]

Rawat *et al.* conducted a prospective study to evaluate the demographic profile of sinonasal masses, the clinical and radiological findings of sinonasal masses and the correlation of the clinical and radiological findings with the histopathology. They enrolled 264 cases of sinonasal masses, inflammatory, and tumor such as lesions were 68.56 % cases, benign tumors were 22.72% (60 cases) and the malignant were 8.71% (23 cases). The ratio of inflammatory and tumor such as lesions to neoplastic lesions was 2.18:1. They concluded that significant lesions can be missed on either clinical or radiological evaluation

and a thorough histopathological evaluation should be done in all cases of nasal polypoidal lesions for accurate diagnosis and management.^[20]

CONCLUSION

Sinonasal masses are common problem in today's environment. Sinonasal masses constitute a very wide spectrum of differentiated diagnosis. They have a male predominance and majority are non-neoplastic. Nasal polyps are the most commonly encountered sinonasal masses. HPE still remains the gold standard for diagnosis in most cases. Because of this fact it is essential for otorhinolaryngologists to make the general practitioners aware so that they do not go on treating it as a benign sinusitis. Any sinonasal problem not responding in 6 weeks must be sent to an expert for further evaluation. Correlation of clinical, radiological, and histopathological modalities is most important for accurate diagnosis. A careful histopathological correlation is mandatory for proper diagnosis, accurate, and early management.

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The authors report nothing to declare.

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