

A Clinicoradiological Study and Treatment of Masses in Sinonasal Cavity Presenting at a Tertiary Care Medical Centre

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Abstract

Introduction: Various etiological factors for the development of sinonasal masses are human papillomavirus 6 and 11, allergens, air pollution, and industrial carcinogens, tobacco, alcohol, and occupational exposure to heavy metals (such as nickel and chromium), particularly for workers in the leather, textile, furniture, and wood industries.

Aim and Objectives: To correlate the symptoms, signs with the clinical staging and To correlate the clinical features with the pathological staging.

Material and Methods: The present study regarding “Clinicopathological study and management of masses in sinonasal cavity and nasopharynx” was carried out on both the outpatients and inpatients of Department of ENT at Saraswathi Institute of Medical Sciences, Hapur a tertiary care centre from July 2021 to Dec 2022. Only those patients presenting with mass in sinonasal cavity or mass diagnosed after complete clinical examination (including endoscopic evaluation) were selected for this study.

Result: In the present study 98.21% study subjects had nasal obstruction, 73.21% study subjects had headache, 48.21% study subjects had bilateral complaint, 23.21% subjects had facial pain and 19.64% subjects had epistaxis. On CT scan 96.43% stud subjects had maxillary sinus involvement, 83.93% subjects had ethmoid sinus involvement, 23.21% had frontal sinus involvement and 32.14% subjects had sphenoid sinus involvement.

Conclusions: On the basis of our present study we concluded that the work up, management and follow up of sinonasal mass is complicated by the multiple potential sites and stages of development. On CT scan majority of study subjects had maxillary sinus involvement, followed by ethmoid sinus involvement.

Keywords: Sinonasal Mass, Nasopharynx, Epistaxis, Ethmoid Sinus.

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Introduction

The nose is the most prominent part of the face with functional and considerable aesthetic importance. Anatomical position of the nose and its passage have been considered as the direct route to the brain, individual's source of intelligence and

spirituality. Presence of any mass in the nose and paranasal sinuses seems to be a simple problem; however it raises many questions about the differential diagnosis [1]. Various etiological factors for the development of sinonasal masses are

human papillomavirus 6 and 11, allergens, air pollution, and industrial carcinogens, tobacco, alcohol, and occupational exposure to heavy metals (such as nickel and chromium), particularly for workers in the leather, textile, furniture, and wood industries [2].

The symptoms of sino-nasal masses encompass a wide range of symptoms like nasal obstruction, sneezing, epistaxis, disturbance in smell; orbital symptoms like epiphora, proptosis, swelling, diminution of vision; aural symptoms like earache, hard of hearing, snoring, apnoeic spells etc. Anatomically, the sino-nasal pathway being in close proximity to vital structures such as the eyes and the brain, it necessitates the need for its appropriate classification so as to treat it accordingly [3].

A sino nasal mass can have various differential diagnosis. They may be inflammatory, congenital, neoplastic (benign and malignant), traumatic in nature. Classically benign neoplasm expands and remodel bone and aggressive malignancies destroy and invade adjacent tissue with illdefined margin. Various pathologies ranging from non-neoplastic lesion to malignant tumor may present as simple nasal mass. It is not possible to determine clinically what pathology lies underneath [4].

The various benign masses include inflammatory polyp, angiofibroma, invasive fungal sinusitis, inverted papilloma, capillary hemangioma, osteogenic keratocyst, and rhinoscleroma and malignant masses include squamous cell carcinoma adenocarcinoma, esthesioneuroblastoma, extramedullary

plasmacytoma, and hemangiopericytoma [2].

Therefore detailed history, clinical examination, diagnostic nasal endoscopy along with advanced imaging (CT scan and or MRI) are required to make a presumptive diagnosis. Radiographic evidence of thickened mucosa, sinus opacification and bone erosion helps us to diagnose different diseases. However a careful histopathological examination is necessary to decide the nature of any particular lesion for final diagnosis and for management accordingly [5].

Materials and Methods

The present study regarding “Clinicopathological study and management of masses in sinonasal cavity and nasopharynx” was carried out on both the outpatients and inpatients of Department of ENT at Saraswathi Institute of Medical Sciences, Hapur a tertiary care centre from July 2021 to Dec 2022.

Only those patients presenting with mass in sinonasal cavity or mass diagnosed after complete clinical examination (including endoscopic evaluation) were selected for this study. Patients with sinonasal polyp or adenoids were excluded from this study. Already operated or recurrence cases were also not included in study. A detailed history was taken which was followed by a thorough ENT and systemic examination. Biopsy was taken wherever necessary and histopathological examination was done. Along with these, other relevant and necessary investigations were carried out. Based on clinical sign and investigation a diagnosis was arrived and appropriate medical or surgical or both modalities of treatment were carried out.

Table 1: Distribution of Age among study population in years

Age	Frequency	Percentage
Less than 30 years	3	5.36
30-50 years	49	87.50
50-80 years	4	7.14
Total	56	100
Mean \pm SD= 44.803 \pm 9.47		

Among 56 study population, studied that 87.50 % patients came in the range of 30-50 year age group.

Table 2: Distribution of Clinical presentation among study population

Clinical presentation	Frequency	Percentage
Irregular mass	8	14.29
Polypoidal mass	48	85.71
Total	56	100

Among 56 study population, studied that 48 (85.71%) patients had polypoidal mass.

Table 3: Distribution of clinical diagnosis among study population

Clinical diagnosis	Frequency	Percentage
Antrochoanal polyp	17	30.36
B/L ethmoidal polyp	26	46.43
Sinonasal carcinoma	5	8.93
Sinonasal polyposis	8	14.29
Total	56	100

Among 56 study population, studied that 26 (46.43%) patients had B/L ethmoidal polyp.

Table 4: Distribution of Radiological diagnosis among study population

Radiological diagnosis	Frequency	Percentage
Antrochoanal polyp	19	33.93
B/L Sinonasal polyp	28	50.00
Sinonasal carcinoma	7	12.50
Sinonasal polyposis	2	3.57
Total	56	100

Among 56 study population, studied that 28 (50%) patients diagnosed b/l sinonasal polyp

Table 5: Distribution of endoscopic diagnosis among study population

Endoscopic Diagnosis	Frequency	Percentage
Antrochoanal Polyp	18	32.14
B/L ethmoidal polyp	23	41.07
Sinonasal Carcinoma	6	10.71
Sinonasal Polyposis	9	16.07
Total	56	100

Among 56 study population, studied that 23 (41.07%) patients had diagnosed with B/L ethmoidal polyp

Table 6: Distribution of unilateral/ bilateral among study population

Clinical features	no	%
Bilateral	27	48.21
Epistaxis	11	19.64
Headache	41	73.21
Facial pain	13	23.21
Nasal obstruction	55	98.21

Table 6 shows Distribution of unilateral/ bilateral among study population, 98.21% study subjects had nasal obstruction, 73.21% study subjects had headache, 48.21% study subjects had bilateral complaint, 23.21% subjects had facial pain and 19.64% subjects had epistaxis

Table 7: Distribution of sinus involved among study population

SINUS	NO	%
Maxillary sinus	54	96.43
Ethmoid sinus	47	83.93
Frontal sinus	13	23.21
Sphenoid sinus	18	32.14

On CT scan 96.43% stud subjects had maxillary sinus involvement, 83.93% subjects had ethmoid sinus involvement, 23.21% had frontal sinus involvement and 32.14% subjects had sphenoid sinus involvement

Table 8: Association of clinical diagnosis and radiological diagnosis

		Radiological diagnosis					Total
		AC polyp	Capillary hemangioma	Nasophayngeal carcinoma	Sinonasal carcinoma	Sinonasal polyp	
Clinical diagnosis	Antrochoanal polyp	16	0	0	0	1	17
	Bleeding polypus	0	1	0	0	0	1
	Sinonasal carcinoma	0	0	1	5	0	6
	Sinonasal polyposis	3	0	0	0	29	32
Total		19	1	1	5	30	56
Chi-square value 150.38, p value- 0.0, significant							

This table shows association of clinical diagnosis with radiological diagnosis, on clinical diagnosis 17 subjects had antrochoanal polyp, in which radiologically 16 had AC polyp, and 1 had sinonasal polyp, on clinical diagnosis, 6 had sinonasal carcinoma, in which 5 study subjects had sinonasal carcinoma on radiology diagnosis, clinically 32 study subjects had sinonasal polyp, in that 29 had sinonasal polyp radiologically and 3 had AC polyp, on comparing there is significant association with p value 0.0

Table 9: Association of clinical diagnosis with endoscopic findings

		Endoscopic diagnosis						Total
		Antrochoanal Polyp	B/L ethmoidal polyp	Bleeding polypus	Inverted Papilloma	Sinonasal Carcinoma	Sinonasal Polyposis	
Clinical Diagnosis	Antrochoanal Polyp	17	0	0	0	0	0	17
	Bleeding Polypus	0	0	1	0	0	0	1
	Sinonasal Carcinoma	0	0	0	0	6	0	6
	Sinonasal Polyposis	1	23	0	1	0	7	32
Total		18	23	1	1	6	7	56
Chi-square value- 163.23, p value- 0.0, significant								

Table 9 shows Association of clinical diagnosis with endoscopic findings, clinically 17 study subjects had antrochoanal polyp, on endoscopy all 17 had antrochoanal polyp, clinically 32

subjects had sinonasal polyposis, in that on endoscopy 7 had sinonasal polyp, 23 had ethmoid polyp, and 1 had antrochoanal polyp. On comparing there is significant association between two groups.

Discussion

Age

In the present study 87.50 % patients came in the range of 30-50 year age group. Most patients suffer during 2nd to 4th decades of their life. Bakari *et al* had reported a peak incidence at the age of 33 years, but Zafar *et al* reported mean age as 22.5 years.^{5,6} According to literature nasal polyps result from chronic events of inflammatory cascades in sinonasal mucous membranes and are considered the most common tumours of the nasal cavity. The exact pathogenesis is unknown, but a strong association with allergy, recurrent infections, asthma and aspirin sensitivity has been implicated.

In the study by Nitin Deosthale *et al* [3], majority of study subjects belonged to 4th and 5th decade of life (28% and 22.66% respectively) which was like the findings in studies by Vaghela K *et al*, [5] Maheshwari A *et al* [6]

Clinical feature

In the present study 98.21% study subjects had nasal obstruction, 73.21% study subjects had headache, 48.21% study subjects had bilateral complaint, 23.21% subjects had facial pain and 19.64% subjects had epistaxis, Nitin Deosthale *et al* [3] shows Nasal obstruction (97.33%) followed by nasal discharge (76%) were the most common presenting complaints in our study subjects. Maheshwari *et al* [6] also found nasal obstruction in 88.75% and nasal discharge in 72.5% patients as common clinical presentation. Humayun *et al* [7] found nasal obstruction (100%) in all patients of sino-nasal mass. Our findings are also consistent with the studies done by Bist *et al* [8]. In our study, most of the cases were unilateral (74.67%) with majority of patients having right sided tumour (38.67%). According to

Maheshwari *et al* [6] study, majority of the Sino-nasal masses were unilateral (56.25%). Similar was the finding observed by Bist *et al* [8] (74.55%). In contrast, Lathi *et al* [9] reported a high incidence of bilateral sinonasal mass (51.8%) so also by Zafar *et al* [10] (60%). This difference might be due to geographical variation

HRCT findings

In the present study Among 56 study population, studied that 30 (53.57%) patients had bilateral mass on hrct. On ct scan 96.43% stud subjects had maxillary sinus involvement, 83.93% subjects had ethmoid sinus involvement, 23.21% had frontal sinus involvement and 32.14% subjects had sphenoid sinus involvement.

78.57% subjects had turbinate hypertrophy, 89.29% subjects had DNS, 33.93% study subjects had Nasopharyngeal extension, 10.71% study subjects had bony erosion. Study by Rashmi Kandukuri *et al* [11] shows Most common sinus involved was maxillary sinus followed by anterior ethmoid, posterior ethmoid, frontal and sphenoid sinuses. Present study correlates well with studies done by Kushwah APS *et al*. [12], where maxillary sinus was most commonly involved. In all the studies sphenoid was least involved, which is also observed in the present study. Commonest pattern of inflammation was osteomeatal unit pattern followed by sinonasal polyposis which was also observed in study by Maru YK *et al*. [13]. The various sinonasal pathologies diagnosed on CT are classified based on their imaging features. Most common sinonasal pathology in present study was inflammatory (77.14%) followed by benign neoplastic (12%) and malignant lesions (9.7%).

Association of clinical with radiological findings

In the present study on clinical diagnosis 17 subjects had antrochoanal polyp, in which radiologically 16 had ac polyp, and 1 had sinonasal polyp, on clinical diagnosis, 6 had sinonasal carcinoma, in which 5 study subjects had sinonasal carcinoma on radiology diagnosis, clinically 32 study subjects had sinonasal polyp, in that 29 had sinonasal polyp radiologically and 3 had ac polyp, on comparing there is significant difference with p value 0.0. CT scan has been very useful and informative as an aid in diagnosis and tumor staging, and for appropriate management.

All the patient of sino-nasal masses had undergone CT scan except 10 cases having small lesions confined to nasal septum anteriorly and could be easily visualized. Several studies have provided evidence that CT and symptoms do not necessarily correlate. In a study by Bolger *et al.* [14] 42 % of asymptomatic patients had mucosal changes on CT scan. In a study Stankiewicz and Chow [15] examined 78 patients meeting chronic rhinosinusitis symptom criteria of which only 47 % had evidence of chronic rhinosinusitis on CT. A prospective study of patients without chronic rhinosinusitis by Flinn *et al.* [16] found that 27 % had mucosal changes suggestive of chronic rhinosinusitis.

Association of clinical with endoscopic findings

In the present study, clinically 17 study subjects had antrochoanal polyp, on endoscopy all 17 had antrochoanal polyp, clinically 32 subjects had sinonasal polyposis, in that on endoscopy 7 had sinonasal polyp, 23 had ethmoid polyp, and 1 had antrochoanal polyp. On comparing there is significant association between two groups. Nasal endoscopy permits a thorough examination of intranasal anatomy and identification of pathology involving anterior rhinoscopy.

The technique is recognized as more sensitive than CT scan for the investigation of accessible disease and gives more important information regarding recurrence/residual disease postoperatively. The diagnostic algorithm for sinus diseases continues to evolve along with the advances in imaging modality. In study by Vanitha Brindha Baba Caliaperoumal *et al* [17] the symptom score had a moderate correlation with the Lund-Kennedy Endoscopic score ($r=0.643$, $p<0.001$), which is similar to the study done by Tomassen *et al.* [18], where it was found that symptom-based CRS was statistically associated with positive endoscopy findings.

According to Bhattacharyya and Lee, [19] when endoscopy findings were combined with symptom scores, it significantly increased the diagnostic value compared with CT scans. Ferguson *et al.* concluded that endoscopy has high specificity but low sensitivity; hence, it can only be used for diagnosing patients with CRS but not for ruling it out. Deepthi *et al* [20], in their study, found a positive correlation between subjective symptom severity and objective endoscopic and radiologic finding.

Association of clinical diagnosis with histopathological diagnosis,

In the present study on clinically 17 study subjects had antrochoanal polyp, which on histopathology 16 had inflammatory nasal polyp, 1 had pyogenic granuloma, clinically 32 had sinonasal polyp, in which 31 had inflammatory polyp, and 1 had inverted papilloma, on comparing there is significant association with p value 0.0. According to Alun-Jones *et al* [21] the clinical selection of nasal polyps for histology has been recommended as a possible compromise between additional hospital cost and/or workload and acceptable medical practice. However, in this study, the use of clinical criteria as a method for selecting nasal polyps for histology proved inadequate, as several

cases of polyps with sinister pathology would have escaped diagnosis.

Associations of radiological diagnosis with histopathological diagnosis.

On radiology 19 subjects had AC polyp, in that 18 subjects had inflammatory nasal polyp, out of 30 subjects with sinonasal polyp on radiological investigation, 29 subjects had inflammatory nasal polyp and 1 subject had inverted papilloma, on comparing there is significant association with p value 0.0. Earlier, plain radiographs were one of the basis of diagnosis of the diseases involving sinuses but now high resolution computerized tomography have replaced plain radiographs for the investigation of the sinus diseases. CT scan is an useful and informative aid in diagnosis and tumour staging and for proper management. All the patient of sinonasal masses had undergone CT scan. Several studies have provided evidence that CT and symptoms do not necessarily correlate. In a study by Bolger WE *et al*, [14] 42% of asymptomatic patients had mucosal changes on CT scan. In a study Stankiewicz JA *et al*, [15] examined 78 patients meeting chronic rhinosinusitis symptom criteria of which only 47% had evidence of chronic rhinosinusitis on CT. A prospective study of patients without chronic rhinosinusitis by Flinn J *et al*, [16] found that 27% had mucosal changes suggestive of chronic rhinosinusitis.

Conclusions

On the basis of our present study we concluded that the work up, management and follow up of sinonasal mass is complicated by the multiple potential sites and stages of development. On CT scan majority of study subjects had maxillary sinus involvement, followed by ethmoid sinus involvement, on comparing there is significant association between clinical diagnosis and radiological diagnosis.

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