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A Clinicopathological Study of Nasal and Paranasal Masses in A Tertiary Care Hospital

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Introduction

The nose is the most protuberant part of the face with substantial aesthetic and functional significance. The anatomical location and nasal passage have been regarded as a direct avenue to the brain [1] .The nasal cavity and paranasal sinuses including the maxillary, ethmoid, sphenoid and frontal sinuses are collectively referred to as the sinonasal tract.[2]

Nasal masses are a common finding in an ENT outpatient department. They are essentially rounded projections of oedematous membrane above a mucosal surface and projects into the lumen.[3] Sinonasal area is exposed to various infective agents, chemicals, antigens, mechanical and many other influences. These deleterious exposures lead to formation of tumour like and neoplastic conditions [4].

Out of these nasal masses, the non-neoplastic lesions include polyps (inflammatory and allergic), rhinoscleroma, rhinosporidiosis, tuberculosis, actinomycosis, filariasis and many non-specific inflammations[5]. The congenital lesions are comprised mainly of dermoids, glioma and encephalocele [6]. The non-neoplastic polyps are the most common masses affecting up to four percent of the population. [7]

The neoplastic lesions are of benign and malignant types. The benign neoplastic lesions include haemangioma, inverted papilloma, mucocele and angiofibroma; while the malignant neoplastic lesions include squamous cell carcinoma and adenocarcinoma. [8,9,10].

Most of the nasal masses present with the complaint of nasal obstruction [1] . Other symptoms like sneezing and rhinorrhoea are also seen. All these symptoms significantly disturb daily life of the patients [6,11].

The presenting features, symptomatology and advanced imaging techniques help to reach a presumptive diagnosis, but histopathological examination remains the mainstay of final definitive diagnosis. [12] The presenting clinical feature of non-neoplastic and neoplastic nasal masses may be indistinguishable from each other leading to delay in proper diagnosis and treatment. [13] Thus careful histological workup is essential for a correct diagnosis and timely intervention. [14]

Aims and Objectives

1. To study the clinical presentation of patients with nasal and paranasal masses.
2. To study the pathology of nasal and paranasal masses.

Materials and Methods

The present study was carried out in the Department of Pathology in a Tertiary care hospital, after obtaining Institutional Ethics Committee approval. The biopsies and resected specimens with clinical diagnosis of the non-neoplastic and neoplastic lesions of the nose and paranasal sinuses, received during a period of 2 years were studied. The present study was a cross-sectional study, conducted during a period of 2 years. Wherever possible, cytology samples using sterile nasal swab and imprint cytology of excised specimens were obtained. The cytological smears, both dry and wet were stained with Giemsa, Haematoxylin and Eosin and Papanicolaou stains. Biopsies and resected specimens were received in 10% formalin, gross findings were noted, tissue processed and stained with Haemotoxylin and Eosin stain. Special stains like Periodic Acid Schiff and Gomori Methanamine Silver were used wherever required. Cytological and histopathological examination under light microscope were carried out and the findings were noted.

Observations and Results

- A total of 75 specimens of masses of nasal cavity, paranasal sinuses and nasopharynx were received during the study period.
- The results of the study are shown in the following tables

Table 1: Age wise distribution of Nasal & Paranasal masses

Age In decades	Non-neoplastic	Neoplastic		Total
		Benign	Malignant	
0-10	1	1	-	02(2.67%)
11-20	8	2	1	11(14.66%)
21-30	7	5	1	13(17.33%)
31-40	11	4	3	18(24.00%)
41-50	5	3	2	10(13.33%)
51-60	7	3	3	13(17.33%)
61-70	2	3	-	05(6.66%)
71-80	1	1	1	03(4%)
Total	**42(56%)**	**22(29.33%)**	**11(14.66%)**	**75(100%)**

Table 2: Sex wise distribution of nasal and paranasal masses.

		Male	Female	Total
Non-neoplastic	Polyps	13	20	33
	Others	06	03	09
Neoplastic	Benign	13	09	22
	Malignant	07	04	11
Total		**39(52%)**	**36(48%)**	

Table 3: Incidence of various non-neoplastic lesions

Non-neoplastic Nasal and Paranasal masses	Number of cases	Percentage (%)
Inflammatory polyp (Non-allergic)	26	62%
Allergic polyp	7	17%
Aspergillosis	2	5%
Epidermal cyst with giant cell reaction	2	5%
Rhinosporidiosis	1	3%
Rhinoscleroma	1	2%
Hansen's disease	1	2%
Necrotizing lesion with dense acute inflammation and fungal infection	1	2%
Nasolabial cyst	1	2%
TOTAL	**42**	**100%**

Table 4: Incidence of various benign neoplastic lesions

Benign neoplastic lesions	Number of cases	Percentage (%)
Inverted Papilloma	10	45%
Hemangioma	3	14%
Nasopharyngeal Angiofibroma	2	9%
Benign Fibroangiomatous lesion	2	9%
Heterotopic nasal glioma	1	4%
Juvenile Xanthogranuloma	1	4%
Osteoblastoma	1	5%
Ameloblastoma	1	5%
Salivary gland type adenoma	1	5%
TOTAL	**22**	**100%**

Table 5: Incidence of various malignant neoplastic lesions.

Malignant lesions	Number of cases	Percentage (%)
Squamous cell carcinoma	3	28%
Nasal melanoma	1	9%
Mucoepidermoid Carcinoma	1	9%
Intestinal type of adenocarcinoma-Colonic variant	1	9%
Intestinal type of papillary sinonasal adenocarcinoma	1	9%
Olfactory neuroblastoma	1	9%
Well differentiated osteosarcoma	1	9%
Plasma cell neoplasm	1	9%
Non Hodgkins lymphoma (Plasmablastic type)	1	9%
TOTAL	11	100%

Inflammatory polyp

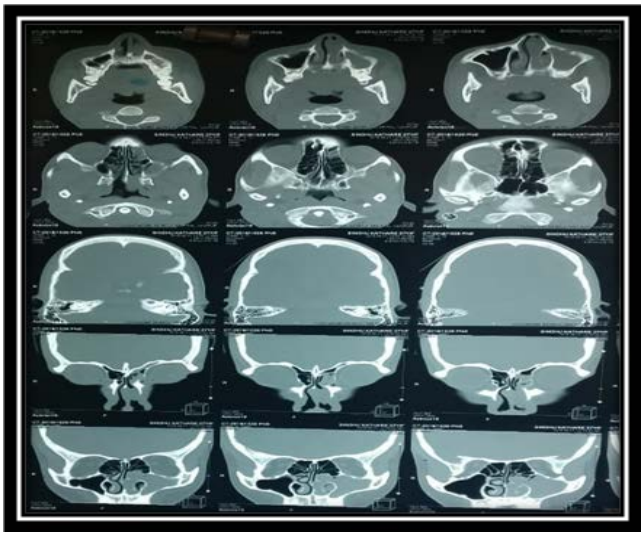

Figure 1a: CT image shows opacity in the right sided nasal cavity(arrow).

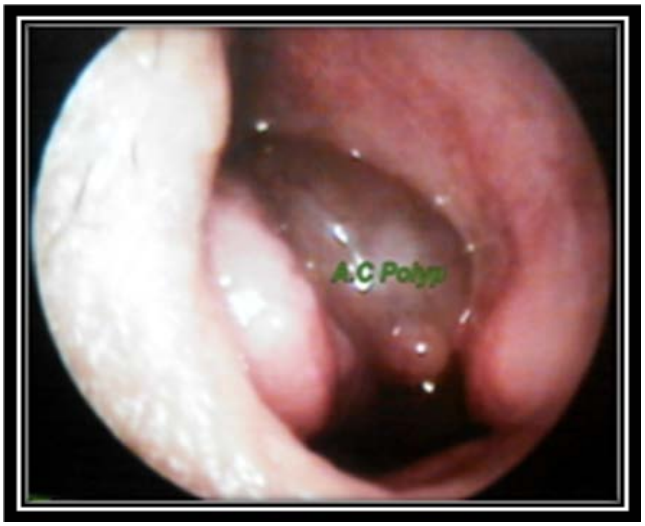

Figure 1b: Nasal endoscopy shows single polypoidal smooth bluish yellow mass.

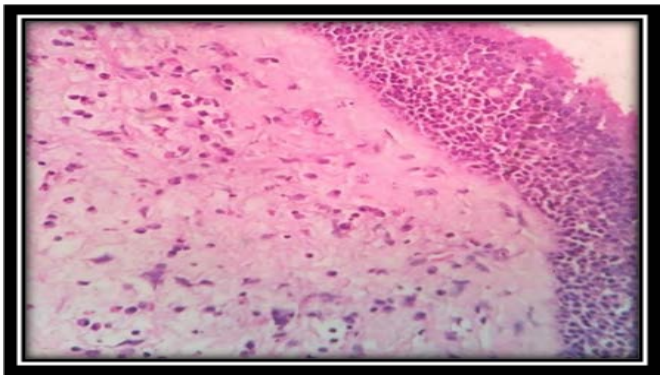

Figure 1c: Photomicrograph of inflammatory polyp shows lining pseudostratified ciliated columnar epithelium with loose oedematous connective tissue stoma infiltrated with lymphocytes, neutrophils, few plasma cells and eosinophils.(Haematoxylin and eosin stain 40x).

Allergic Polyp

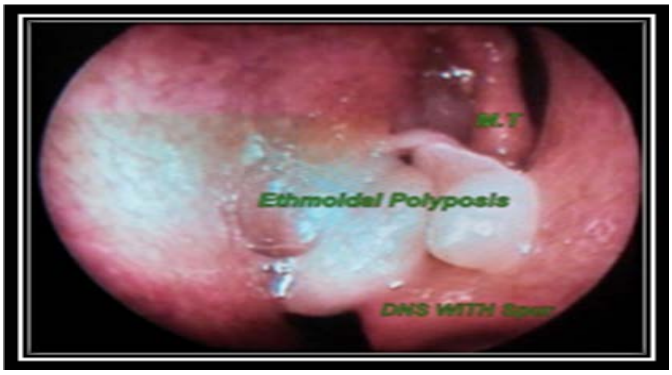

Figure 2a: Nasal endoscopy shows multiple greyish white polypoidal masses

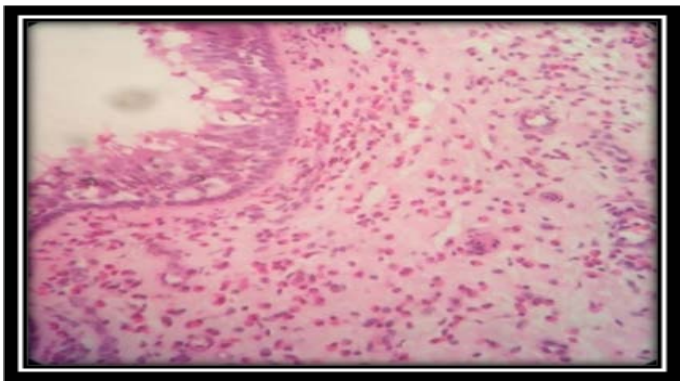

Figure 2b: Photomicrograph of allergic polyp shows lining pseudostratified ciliated columnar epithelium

with loose oedematous connective tissue stoma infiltrated mainly with eosinophils, few neutrophils and occasional lymphocytes. (Haematoxylin and eosin stain 40x)

Rhinosporidiosis

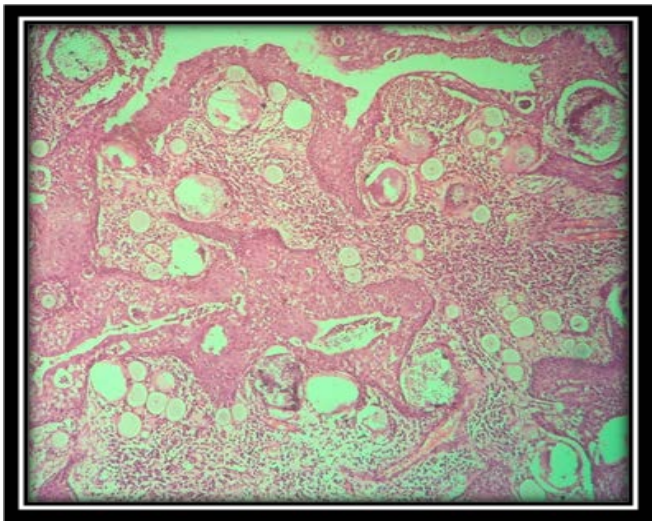

Figure 3: Histopathological examination shows sporangia (arrow) containing spores of rhinosporidiosis in a nasal polyp. (Haematoxylin and eosin stain 10x)

Inverted Papilloma

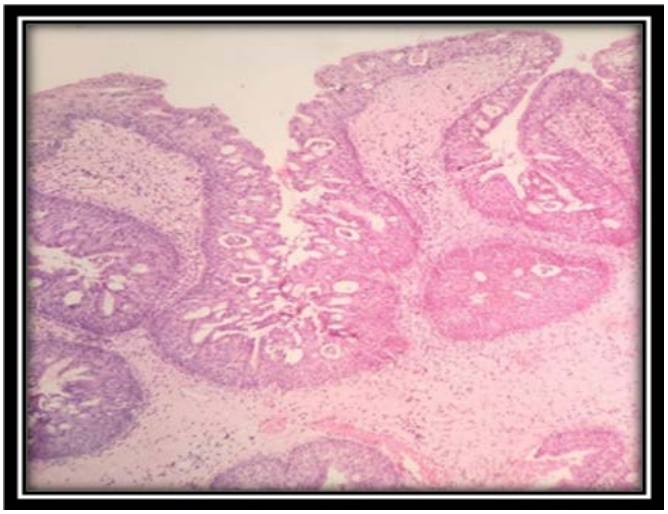

Figure 4: Photomicrograph shows papillary structure lined by stratified columnar epithelium with goblet cell hyperplasia, surrounded by fibroconnective tissue stroma showing dense chronic inflammatory cells. (Haematoxylin and eosin stain 40x)

Squamous cell carcinoma- Maxillary sinus

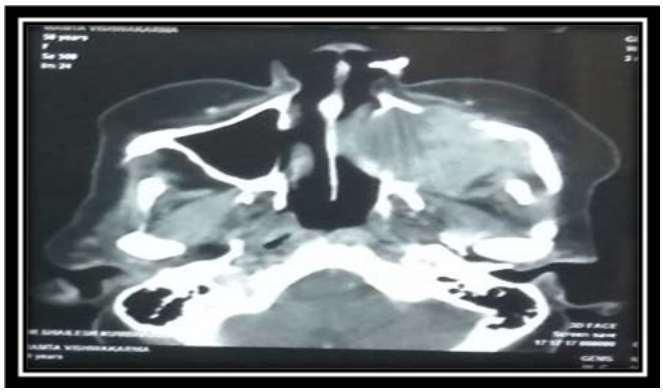

Figure 5a: CT image shows mass (arrow) arising and completely filling left sided maxillary sinus (arrow) eroding bony roof, floor, medial and lateral wall of the sinus

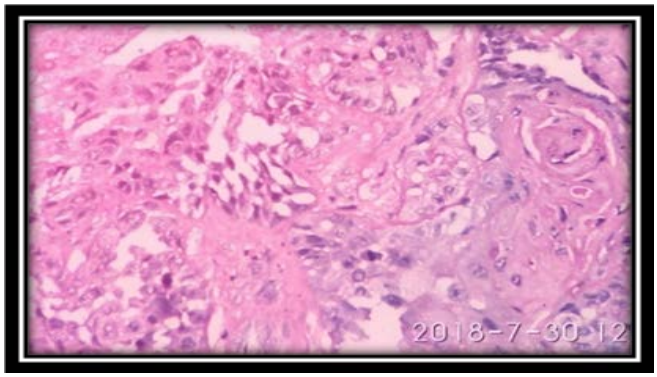

Figure 5b: Photomicrograph of squamous cell carcinoma shows sheets and few scattered pleomorphic polygonal cells with occasional keratin pearls (Haematoxylin and eosin stain 40x).

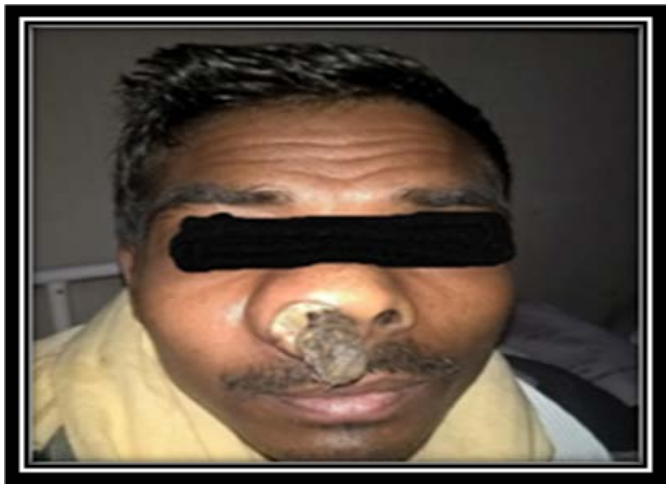

Figure 6a: Clinical picture of osteosarcoma shows mass arising from right sided nasal cavity.

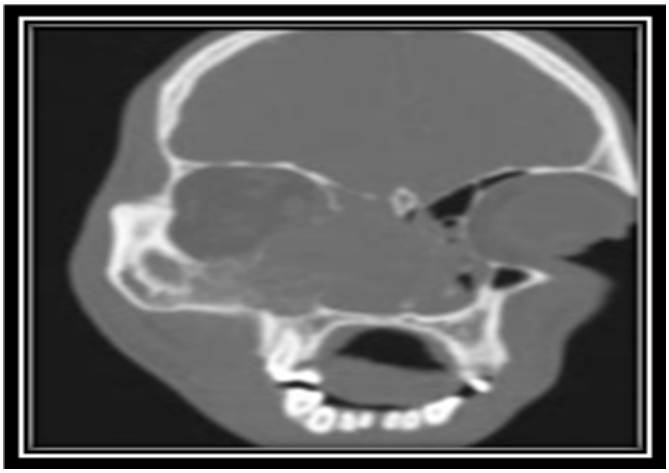

Figure 6b: Mass (arrow) arising from right sided maxillary sinus and completely filling right sided nasal cavity, eroding bony roof, floor, medial and lateral wall of the sinus

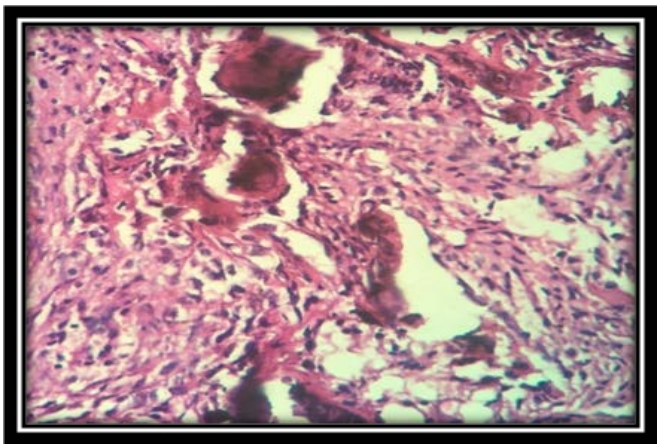

Figure 6c: Photomicrograph of osteosarcoma-maxillary sinus reveals fine neoplastic bony trabeculae composed of malignant tumour cell, with irregular osteoblastic rimming and minimal intervening stroma. (Haematoxylin and eosin stain 10x)

Discussion

Nasal masses have been known to be a common affliction of man, since the days of Hippocrates. [2] They are common findings in the ENT OPD presenting with complaints like nasal obstruction, nasal discharge, epistaxis and disturbances of smell. Their aetiology is varied- congenital, inflammatory, neoplastic and traumatic. [15] Nasal polyps are the most common nasal masses affecting up to four percent of the population. [7]

A variety of non-neoplastic and neoplastic conditions involve the nasal cavity, paranasal sinuses (PNS) and nasopharynx. [16] These lesions are quite impossible to differentiate clinically and they are frequently neglected by the clinicians as being of infective or allergic aetiology. [13] Hence, clinical and pathological evaluation of nasal and paranasal masses should be done conjointly because, sometimes unexpected but clinically relevant findings can be established on routine histopathological examination. [17] Thus, along with clinical features and advanced imaging technique, histopathological examination remains the gold standard to illustrate definitive diagnosis. [14]

In our study, histopathological evaluation of nasal and paranasal masses was done in 75 cases, obtained in a period of 2 years in our tertiary care hospital. The commonest nasal and paranasal lesions were non-neoplastic in nature, which accounted for 42 cases (56%), followed by 22 (29.33%) benign neoplastic lesions and 11 (14.67%) malignant lesions. This data correlated with the other studies [1,2,7,18] mentioned in Table 6 below. However, Humayun et al and Maru et al had comparatively more non-neoplastic lesions and less neoplastic lesions i.e. 70% and 30%, 71% and 29% respectively; as compared to our study. The high percentage for malignant tumours in some studies [1,7] could be because usually these cases are not managed at private hospitals, as their treatment is destructive with obvious morbidity. Hence, they are referred to Tertiary Care Centres.

Table 6: Table showing the occurrence of non-neoplastic and neoplastic sinonasal lesions in different studies.

Sr. no.	Studies	Non- neoplastic lesions	Neoplastic lesions	
			Benign	Malignant
1.	Present study	42 (56%)	22(29.33%)	11(14.66%)
2.	Banerjee et al, 2017	93 (62.42%)	42(28.19%)	14(9.39%)
4.	Naigarangbam et al, 2016	59(57.84%)	15(14.78%)	28(27.38%)
5.	Maru et al, 2015	50(71%)	14(20%)	6(9%)
6.	Humayun et al, 2010	35(70%)	3(6%)	12(24%)

In our study, the age of patients varied from 1 year to 78 years. The mean age was 39.29 years. Overall, nasal and paranasal masses were commonly seen in third to sixth decade, which correlated with the studies of Maru et al [2], Ngairangbam et al[7], Guleria et al[15], Bakri et al[19] and Humayun et al[1]. The current study revealed second and fourth decades of life to be the most vulnerable period for non-neoplastic lesions, as also observed by Lathi et al [2] and Humayun et al [1]. Malignant lesions have been generally reported in fourth to sixth decades in concordance with Parajuli et al [20] and Guleria et al [15].

The common presentation of nasal and paranasal masses in the present study were nasal obstruction (98.6%), nasal discharge (66%) and nasal mass (53%) comparing favourably with other studies by Lathi et al, Maru et al, Bakri et al, Guleria et al, and Humayun et al. [1,20,19,21]

In our study, inflammatory polyps (including allergic) with 33 cases (79%), were the most common nasal non-neoplastic masses, which is in correlation with Parmar et al, Guleria et al and Thomas et al with 74 (92.5%), 130cases (94%) and 44 cases (93%) respectively [12,15,18]. In a Nigerian study by Bakri et al [19], inflammatory polyps were the commonest non-neoplastic sinonasal lesion with 28 cases (36.8%), and in a Nepal study by Parajuli et al [20] the maximum i.e.106 cases (89%) were of inflammatory polyps. Etiological factors associated with inflammatory polyp include Chronic inflammation (Chronic/ Recurrent rhinosinusitis) associated with viral infection, bacterial and fungal infection. In allergic polyp, aetiology includes allergic rhinitis associated with airborne particles, such as grass pollens, moulds and animal allergens, asthma and drug reactions (aspirin intolerance). [22]

Among benign neoplastic lesions, inverted papilloma was the commonest, with 10 cases (45%). Guleria et al, Thomas et al and Maru et al reported 8 cases (66.67%), 7 cases (46.67%) and 8 cases (57%) of inverted papilloma respectively [2,18,20]. A Nigerian study and Bangladesh study showed similar results i.e. inverted papilloma as the commonest benign lesion with 14 cases (38.8%) and 1 case (33%) respectively. [1,19] Most of our patients were in the 31-40 years age group.

We had a single case of heterotopic nasal glioma in a one-year old female child, which correlated with the finding of Garg et al, [23] who had a similar case in a nine months old child. Among malignancies, squamous cell carcinoma was the commonest one with 3 (27%) cases out of total 11 malignant neoplastic tumours of nasal cavity and paranasal masses, which was also seen in the studies of Guleria et al, Thomas et al, Maru et al and Humayun et al [1,2,18,20] who reported an occurrence of 8 (40%), 6 (75%), 2 (33.3%) and 5 (41.67%) cases respectively. Svane Knudson et al also reported squamous cell carcinoma to be the most commonly encountered malignancy in Denmark. [24] We found one case each of other malignancies like mucoepidermoid carcinoma, intestinal type of papillary sinonasal adenocarcinoma, malignant melanoma, well differentiated osteosarcoma, olfactory neuroblastoma and haematological malignancies- plasma cell neoplasm and non-Hodgkin's lymphoma.

In our study, clinico-histopathological correlation was present in 90% cases. Study of 92 sinonasal masses by Gupta et al [25] showed the clinico-histopathological correlation to be 96%. Diamantopoulus et al [26] found clinico-histopathological correlation in 98.9% cases among 2021 patients of nasal and paranasal lesions.

The histopathological diagnosis of the surgically excised nasal and paranasal masses differed from the clinical diagnosis in eight of our cases, as shown below in table 7.

Table 7: Cases with clinico-histopathological disparity in their diagnoses

Clinical diagnosis	Site	Histopathological diagnosis
Fungal polyp	Right sided nasal cavity	Intestinal type of adenocarcinoma-Colonic variant
Inverted papilloma	PNS [Maxillary sinus]	Salivary gland type-adenoma
Squamous papilloma	Left sided nasal cavity	Benign fibroangiomatous lesion
Chondromyxoid fibroma	Right sided nasal cavity	Inverted papilloma
Chondrosarcoma	Bilateral nasal cavity	Mucoepidermoid carcinoma
Allergic polyp	Right sided nasal cavity	Nasopharyngeal angiofibroma
Dermoid cyst	Over the nasal bridge	Heterotopic nasal glioma
Maxillary neoplasm	Middle turbinate of left sided nasal cavity	Allergic polyp

Surgical excision is the main modality of treatment in most of the non-neoplastic and benign neoplastic masses. Wide surgical excision, radiotherapy or chemotherapy is given in malignant masses. Histopathology is required to confirm the diagnosis. Regular follow up is necessary for early detection of recurrence or metastases. [1]

Conclusion

In conclusion, this study showed that commonest nasal and paranasal lesion was the inflammatory polyp, which occurred predominantly in the fourth decade of life, with a male preponderance. Inverted papilloma and Squamous cell carcinoma were the most common benign and malignant neoplastic nasal and paranasal lesions, respectively.

The presenting clinical feature of non-neoplastic and neoplastic nasal masses may be indistinguishable from each other leading to delay in proper diagnosis and treatment. Histopathological examination is a simple, reliable and cost-effective diagnostic procedure for the accurate diagnosis and management of various lesions of nasal cavity, nasopharynx and paranasal sinuses, as a significant number of cases may be missed on clinical evaluation alone.

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