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# HISTOPATHOLOGICAL STUDY OF MASSES OF NASAL CAVITY AND PARANASAL SINUSES.

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## ABSTRACT

**Introduction:** Sinonasal area can give rise to wide variety of lesions due to varied tissue differentiation, ranging from simple polyps to benign and malignant neoplastic lesions. Sinonasal masses with prevalence of 1-4% have similar clinical presentation, making histopathologic examination an important tool for the definite diagnosis.

The aim of the study was to evaluate various lesions arising in the sinonasal tract and confirm them histologically.

**Methods:** A total of 150 cases diagnosed with masses of nasal cavity and paranasal sinuses were studied from January 2022 to January 2024. All the specimen were processed as routine and sections were studied using H and E and special stains as per requirement.

**Results:** Our study showed that majority (128) were non neoplastic cases, of which polyps were most frequently encountered lesion.Out of neoplastic lesions, 14 cases were benign and 08 were malignant.

The commonest benign tumor in this study was sinonasal papilloma. Among the malignant tumors, Squamous cell carcinoma was the most common lesion.

**Conclusion:** Nasal and paranasal lesions comprise a wide spectrum of lesions but their clinical manifestations are often overlapping. Hence categorizing the lesions according to histopathological features ensures correct diagnosis and timely intervention. Non neoplastic lesions are more common pathology presenting as nasal mass.

**Keywords:** Sinonasal mass, Polyp, Mucormycosis, Histopathology.

## INTRODUCTION

The Sinonasal tract comprising of the nasal cavity and paranasal sinuses (maxillary,frontal, ethmoid and sphenoid sinuses) form a complex system of airway, lined by respiratory type pseudostratified ciliated columnar epithelium, known as schneiderian membrane and contain mucocytes(goblet cells).[1]

The roof of the nasal cavity contains olfactory mucosa consisting of: olfactory nerve cell, sustentacular cells and basal cells.[2,3] The sinonasal cavity consists of epithelial and mesenchymal tissues that can lead to varied tumor differentiation in these areas. [4]

Lesions or masses involving the sinonasal area range from simple polyps to benign and malignant neoplastic lesions. [5,6]

Sinonasal masses have a prevalence of 1-4%, with nasal polyps being the most frequent, with an annual incidence of 1 to 20 per 1000 population. [7] Sinonasal carcinomas represent 0.2 – 0.8% of all the carcinomas. [8,9]

Benign neoplasms are of mainly epithelial type and sinonasal papillomas are among the commonly encountered variety. Squamous cell carcinoma is the commonest malignancy. [10]

Most common clinical presentation of patients with sinonasal masses are nasal obstruction, epistaxis, nasal discharge and olfactory disturbances. [11,12]

The etiology of these masses has been linked to occupational exposures and viruses and the conditions can be associated with allergy, asthma and various infections. [6]

Clinical history of the patient, radiological investigations and endoscopic evaluation helps in making the presumptive diagnosis. However, the definitive diagnosis relies on the histopathological examination. [13]

**OBJECTIVE**

The aim of the study was to evaluate various lesions arising in the sinonasal tract and confirm them histologically.

**MATERIALS AND METHODS**

A prospective study was conducted at Pathology department, Rajindra Hospital, Patiala from January 2022 to January 2024.

It included 150 diagnosed cases of sinonasal tract masses whose excised specimens were received in 10% formalin in the pathology department and after gross examination, they were processed as routine and stained with haematoxylin and eosin. Patient's personal details, clinical history and relevant investigations were retrieved from the requisition form.

Inclusion criteria: Specimens of sinonasal masses received in 10% formalin, properly preserved, well labelled and with complete patient details.

Exclusion criteria: Poorly preserved, autolytic specimens.

**RESULTS**

Out of the 150 cases included in the study, 128 were found to be non neoplastic and 22 were neoplastic. Out of the 22 tumour cases, 14 were diagnosed as benign and 08 as malignant.

99 patients (66%) with sinonasal masses in our study were males and 51 (34%) were females.

The most commonly encountered among the non neoplastic lesions were Chronic rhinosinusitis with polyps(Inflammatory polyps) followed by allergic polyps. (Table 1)

Papillomas were found to be the commonest among the benign variety.

The most common malignant lesion observed in the study was Squamous Cell Carcinoma .

In each category of lesions, male preponderance was seen.

The youngest patient in the study was 8 years old and the oldest 75 years.

Most of the patients with sinonasal masses were of 4th decade (23.4%), 6th decade(18.7%) followed by 2nd decade.

Majority of the lesions in the study were present in the nasal cavity(87 cases) followed by paranasal sinus(63 cases)

**DISCUSSION**

The sinonasal tract is one such region which can give rise to wide variety of tumor masses, as its epithelial lining is capable of differentiation along various cell lines.

There can be non neoplastic conditions presenting as sinonasal masses, which includes Chronic Rhinosinusitis, Inflammatory polyp, allergic polyps, fungal sinusitis, allergic sinusitis, invasive fungal rhinosinusitis, chronic non specific inflammatory pathology and granulomatous pathology.

Based on endoscopic findings, Chronic Rhinosinusitis has been classified as with polyps (CRSwNPs) and without polyps(CRSsNPs).

Poyps are benign non neoplastic inflammatory outgrowth of sinonasal mucosa, commonly involving nasal cavity and ethmoid sinus and occuring bilaterally. These are the most common

space occupying lesion of the sinonasal tract, which histologically shows edematous stroma infiltrated by mixed inflammatory cells. Rarely, there can be osseous metaplasia. Our study had one case of CRSwNP with osseous metaplasia in male patient and overall Allergic polyps show more eosinophilic infiltrate.[14]

CRSsNPs show basement membrane thickening with goblet cell hyperplasia.

Fungal rhinosinusitis can be categorised into non-invasive and invasive types. Invasive fungal rhinosinusitis is caused by various fungal organisms, most commonly *Zygomycetes* (such as *Mucor* and *Rhizopus*) and *Aspergillus*.

Mucormycosis is an opportunistic fungal infection characterised by tissue necrosis as it invades the blood vessels and subsequently causes thrombosis and rapid tissue damage.[15] Diagnosis is made by the presence of broad non septate hyphae branching at 90degrees.

In this study, nasal polyps were found to be the most prevalent among the non-neoplastic lesions(71.8%).[16]

Mucormycosis was the second common lesion, owing to the Covid period. (18.7%)

For the development of mucormycosis, besides low immunity due to covid 19, additional risk factors such as uncontrolled blood sugar and corticosteroid usage also played a role. Glucose-related protein 78 is the entry route for both SARS Cov-2 virus and mucor, thereby increasing the incidence of mucor infection during Covid period.[17]

Benign sinonasal neoplasms are classified as epithelial or mesenchymal. Epithelial variety includes sinonasal papillomas, squamous papilloma and minor salivary gland tumors. Sinonasal or schneiderian papillomas are of 3 types: exophytic, inverted(the most common) and oncocytic. These papillomas have varying growth patterns composed of multilayered epithelium with mucocytes and inflammatory cells. In our study, the most frequently observed benign neoplasm was sinonasal papillomas.[18,19]

Squamous papilloma are benign exophytic, papillary or verrucoid overgrowths of surface epithelium.

Benign salivary gland tumors in the sinonasal region are rare, but pleomorphic adenoma is the most frequently encountered histologic type. It is comprised of epithelial and myoepithelial cells, with variable amount of chondromyxoid stroma. Our study had one case of pleomorphic adenoma.[20]

Mesenchymal neoplasms include paraganglioma, lobular capillary hemangioma(LCH), meningioma, leiomyoma, osteoma, chondroma, chondromyxoid fibroma etc.

Pyogenic granuloma, also known as Lobular capillary hemangioma, is a benign polypoid variant of capillary hemangioma, marked by lobular vascular proliferation within the submucosa. We reported 5 cases of LCH. [21]

Our study had 1 case of chondromyxoid fibroma, a benign cartilaginous tumor comprised of lobules of myxoid to chondroid tissue with intervening multinucleated giant cells.[22] Malignant tumours include epithelial (Squamous cell carcinoma and its variants, sinonasal undifferentiated carcinoma and adenocarcinomas), hematolymphoid (Non hodgkins and others) and mesenchymal (olfactory neuroblastoma, neuroendocrine carcinoma, angiosarcoma, leiomyosarcoma etc).

Squamous cell carcinoma (SCC) is the most prevalent malignancy in the sinonasal tract. In our study, we identified 3 cases of SCC among the 8 malignant tumours.[23]

The commonest malignant epithelial tumour is Squamous cell carcinoma which originates from the surface epithelium and shows variable degree of squamous differentiation. It encompasses both keratinizing and non-keratinizing types, with the keratinizing variant being more common. It is common in males as compared to females and is frequently seen in 6th - 7th decade of life. Our study had 2 cases of Keratinizing SCC and 1 of non keratinizing SCC. All of them were seen in males of 6th - 7th decade.[24] We encountered one case each of Atypical

chondroma, Myoepithelial Carcinoma, Adenoid cystic carcinoma, Round cell tumor and Olfactory neuroblastoma.

Atypical chondroma is hyaline cartilage producing locally aggressive neoplasm, which shows lobular growth pattern with entrapment of lamellar bone trabeculae .[25]

Myoepithelial carcinoma is unencapsulated malignant tumor with infiltrative growth, cytologic atypia and mitotic activity.[26]

Adenoid cystic carcinoma, the predominant tumor of the salivary glands in the sinonasal region, is a biphasic tumor consisting of ductal and myoepithelial cells with a propensity for peri neural invasion. It most commonly presents in 4th - 6th decade with slight female preponderance. [27]

Small round blue cell tumors encompass a diverse range of cancers distinguished by a monomorphic population of undifferentiated tumor cells featuring small nuclei and minimal cytoplasm.[28]

Olfactory neuroblastoma is an uncommon tumor originating from the olfactory sensory epithelium in the upper nasal region. It presents as a small round blue cell tumor with lobulated growth and characteristic features like Homer Wright rosettes and Flexner-Wintersteiner rosettes.[29]

In our investigation involving 150 cases, the most frequently encountered lesions were non-neoplastic (85%), followed by benign (9%) and malignant lesions (5%). These results were consistent with the findings of various studies.[30,31] We observed a higher prevalence of males, with a male-to-female ratio of 1.9:1, similar to other studies.[32] The age group most affected overall in our study was between 30-40 years.

Regarding anatomical distribution, the majority of lesions were found in the nasal cavity (58%), followed by the paranasal sinuses (42%). These findings align with those of several other studies. [33,34]

This could be attributed to the fact that nasal cavity is much more exposed to external agents than the paranasal sinuses.

## CONCLUSION

Sinonasal masses, benign or malignant, have more or less the same clinical presentation, which poses diagnostic and therapeutic dilemma. It thus necessitates the histopathological examination for confirmation of the diagnosis and relevant management.

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**Table 1: Gender wise distribution of non neoplastic lesions.**

| Non neoplastic lesions | Males | Females | Total |
|---|---|---|---|
| • **Chronic Rhinosinusitis**<br>- **with polyp**<br>- **with polyp with osseous metaplasia**<br>- **without polyp**<br>- **with polyp with dysplasia** | 39<br>01<br>02<br>01 | 19<br>0<br>03<br>0 | 58<br>01<br>05<br>01 |
| • **Allergic polyps** | 19 | 12 | 31 |
| • **Infected polyp** | 0 | 01 | 01 |
| • **Chronic non specific inflammatory pathology** | 02 | 01 | 03 |
| • **Granulomatous pathology** | 01 | 0 | 01 |

| | | | |
|---|---|---|---|
| • **Allergic sinusitis** | 02 | 0 | 02 |
| • **Fungal allergic sinusitis** | 0 | 01 | 01 |
| • **Invasive fungal rhinosinusitis (Mucormycosis)** | 14 | 10 | 24 |
| **Total** | 81 | 47 | 128 |

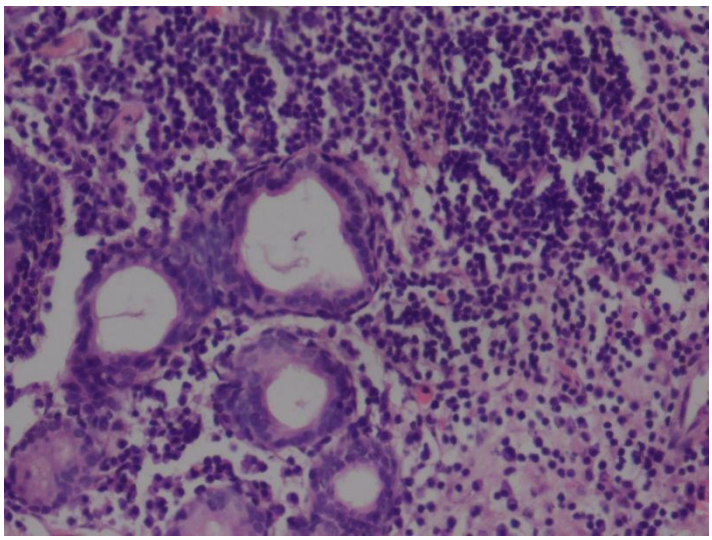

Image 1: H and E stained section showing psudostratified ciliated columnar epithelium. Subepithelium shows lympho-plasmacytic inflammatory infiltrate along with seromucinous glands, consistent with Chronic Sinusitis (4x)

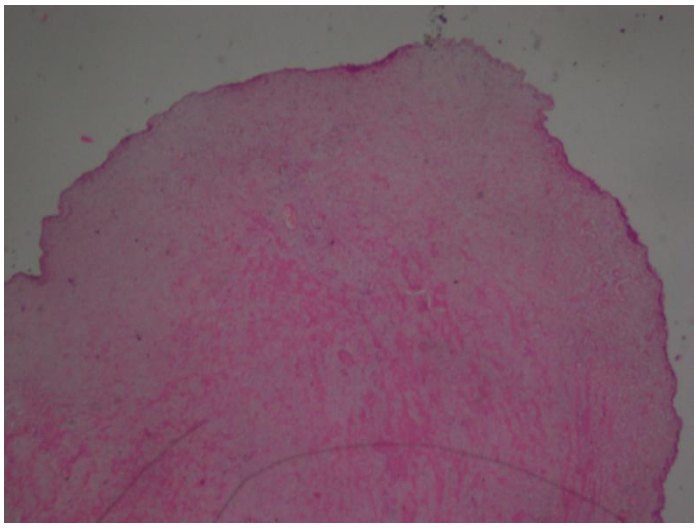

Image 2:H and E stained section showing Polypoidal tissue lined by pseudostratified ciliated columnar epithelium with inflammatory infiltrate in the subepithelium (4x)

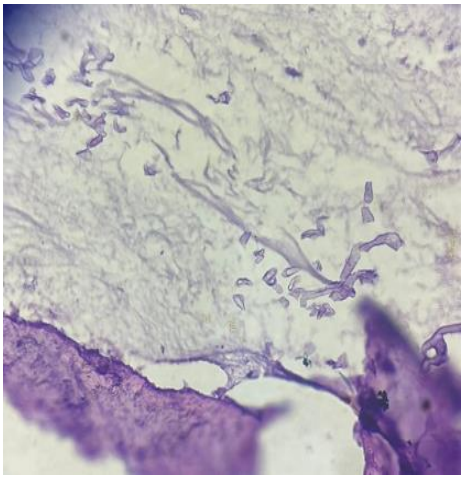

Image3: Microscopic examination showing mucormycosis.

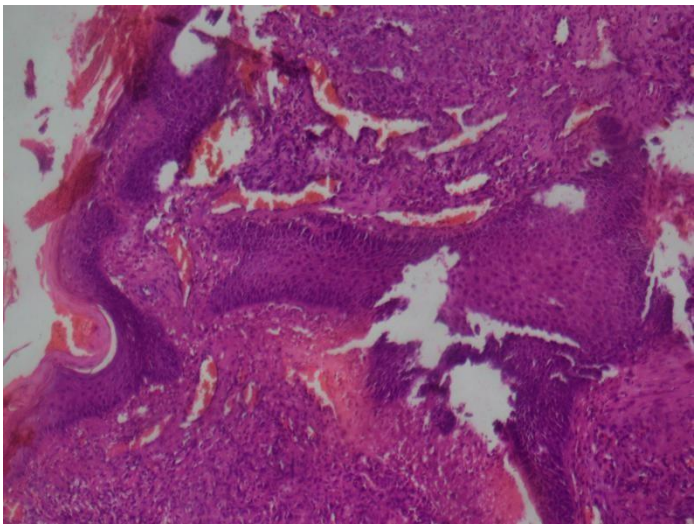

Image 4: H and E stained section shows lining epithelium along with vascular spaces.(Pyogenic granuloma) (4x)

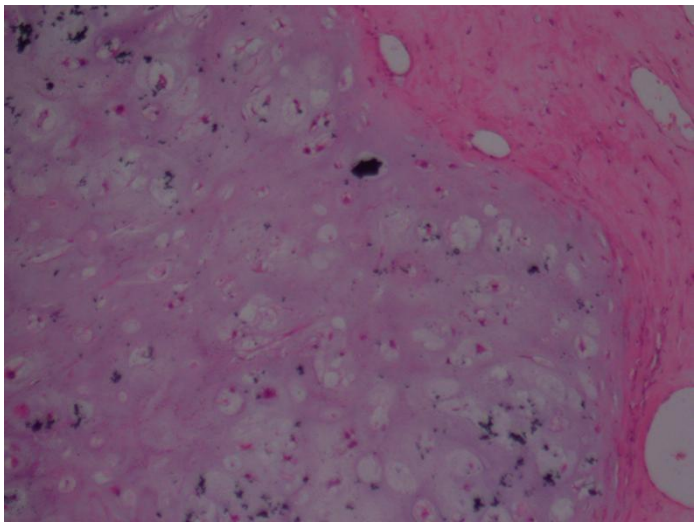

Image 5: H and E stained section showing mature chondrocytes in atypical chondroma(40x)

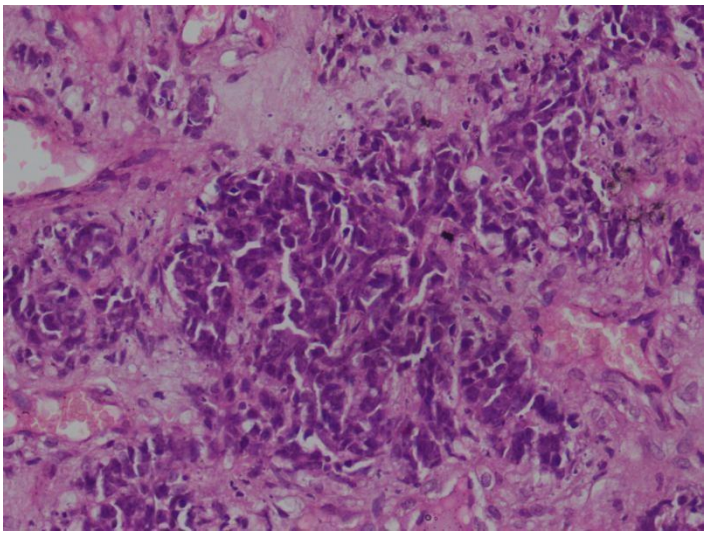

Image 6: H and E stained section showing nests of tumor cells separated by fibroconnective stroma. Individual tumor cells are small with hyperchromatic round to oval nuclei with scant cytoplasm. (Olfactory neuroblastoma) (10x)

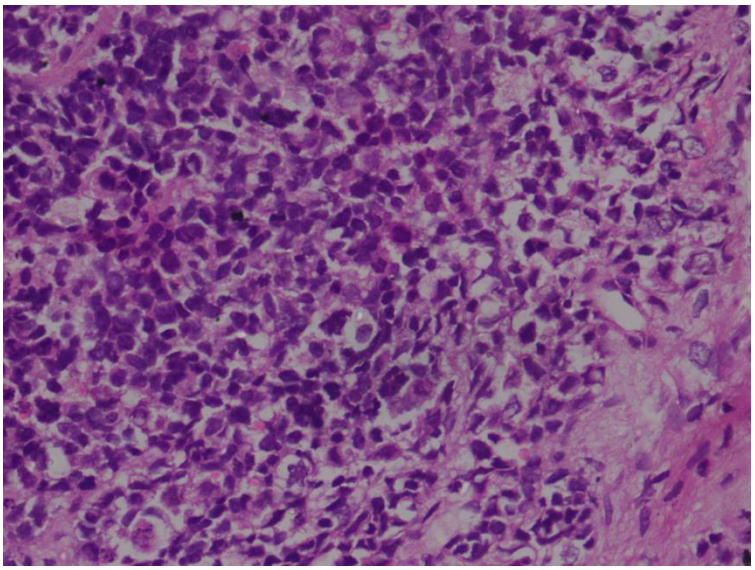

Image 7: Individual tumor cells are small, round with irregular nuclear contour, nuclear pleomorphism, hyperchromatic to vesicular chromatin, high nucleo-cytoplasmic ratio with scant cytoplasm. (Malignant round cell tumor) (40x)

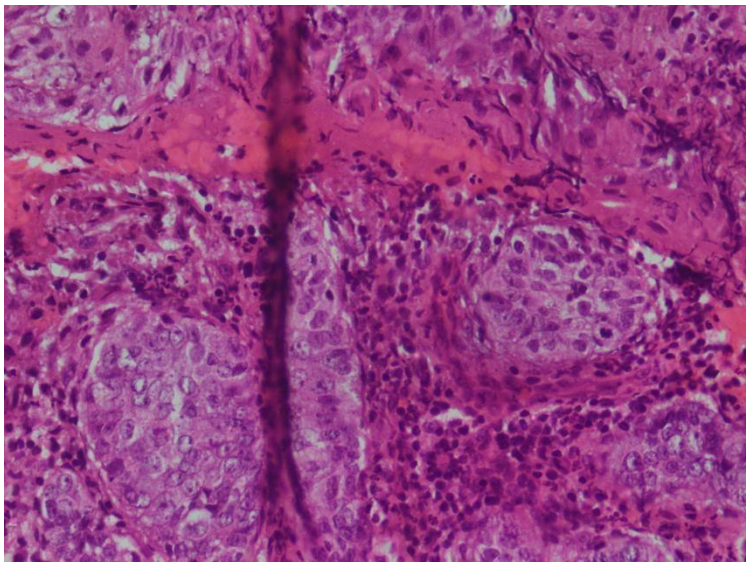

Image 8: Keratinizing Squamous cell carcinoma (10x)

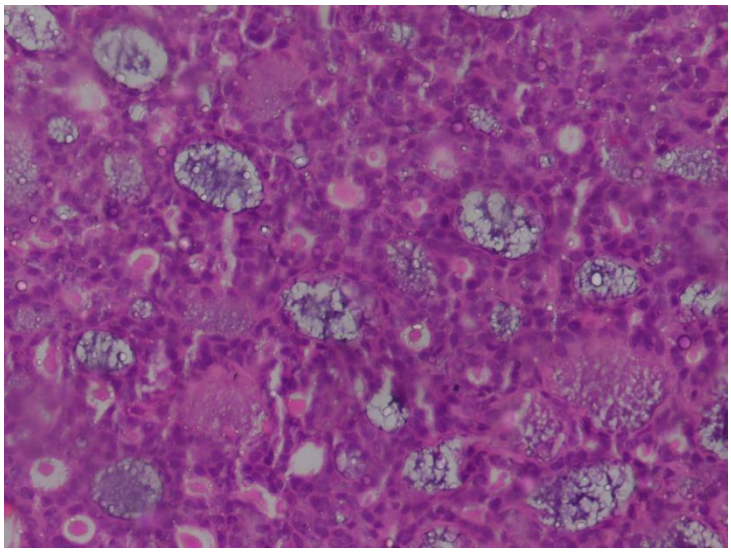

Image 9: Adenoid cystic carcinoma (10x)