

## Original Research Article

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# Histopathological spectrum of sinonasal lesions

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## ABSTRACT

**Background:** A variety of non- neoplastic and neoplastic conditions involve the nasal cavity and paranasal sinuses. Non-neoplastic conditions comprise bulk of these lesions and some of them clinically mimic neoplastic conditions. This study was conducted to analyse the histopathologic spectrum of sinonasal lesions.

**Methods:** A total of 57 cases of sinonasal mass lesions received in department of pathology, world college of medical sciences and research hospital were evaluated. Patient details were obtained from histopathology forms and register. Histopathological examination was carried out according to standard protocol. Percentages and simple frequency tables were used for analysis.

**Results:** Majority of the lesions were found in the nasal cavity (n=45) followed by paranasal sinus (n=12). Non-neoplastic (46 cases) lesions outnumbered neoplastic lesions (11 cases). Infective sinusitis (n=25) was the most common non-neoplastic lesion encountered. Among neoplastic, 6 lesions were benign and 5 were malignant.

**Conclusions:** Nonneoplastic lesions are more common than neoplastic lesions. Clinical and radiological features may be overlapping, hence histopathological examination is essential for final diagnosis and further management.

**Keywords:** Sinonasal lesions, Non-neoplastic, Neoplastic

## INTRODUCTION

A broad spectrum of non-neoplastic and neoplastic conditions affects the nasal cavity and paranasal sinuses.<sup>1</sup> Lesions often present as nasal obstruction, nasal discharge, epistaxis, facial swelling, orbital and ear symptoms or simply as mass lesion. Non- neoplastic conditions comprise bulk of these lesions, some of them clinically mimicking neoplasm. Among neoplastic lesions, benign lesions are more common. Malignant lesions of the sinonasal tract account for not more than 3% of head-and-neck malignancies and <1% of all the malignant tumors.<sup>1</sup>

The presenting features and advanced imaging techniques help to reach a presumptive diagnosis, however histopathological examination remains the mainstay of definitive diagnosis. Thus, careful histological workup is

essential for a correct diagnosis, timely clinical intervention, and therapy.

## METHODS

Present study was a 2 year retrospective study of sinonasal lesions (March 2021-March 2023) conducted in department of pathology, World college of medical sciences and research hospital. Biopsy and resection specimens of sinonasal mass lesions were included. Specimens from paediatric patients were excluded.

A total of 57 specimens were analysed. Detailed information regarding age, gender, clinical status and operation findings were obtained from histopathology request forms and register. The study was approved by the institutional ethics committee. The specimens were fixed in 10% formalin and the tissues were processed and stained following standard protocol procedure. The

sinonasal lesions were classified on histological grounds into neoplastic and non-neoplastic lesions. Detailed information regarding age, gender, clinical status, relevant investigations like fine needle aspiration cytology, thyroid scan, ultrasound reports and operation findings were obtained from histopathology request forms and register. The study was approved by the Institutional Ethics Committee. The specimens were fixed in 10% formalin and the tissues were processed and stained following standard protocol procedure. The thyroid diseases were classified on histological grounds into neoplastic and non-neoplastic lesions. Percentages and simple frequency tables were used for data analysis.

## RESULTS

Over a period of 2 years, 57 cases presented as nasal cavity and paranasal sinus lesions. Histopathological examination revealed that non-neoplastic (n=46) lesions, outnumbered neoplastic lesions (n=11) in a ratio of 4.1:1. Among neoplastic, 6 lesions were benign and 5 were found to be malignant. Most common symptom was nasal obstruction (n=47) followed by nasal discharge (n=6) and swelling of face and cheek (n=4).

Age ranged from 18-88 years with maximum number of cases in the 5<sup>th</sup> decade. M:F ratio was 1.4: 1. Majority lesions were found in the nasal cavity (n=44) followed by paranasal sinus (n=13). Only 5 cases presented with bilateral pathology and the rest were unilateral.

### **Non-neoplastic lesions (n=46) (Table 1)**

#### *Sinonasal polyp (n=8)*

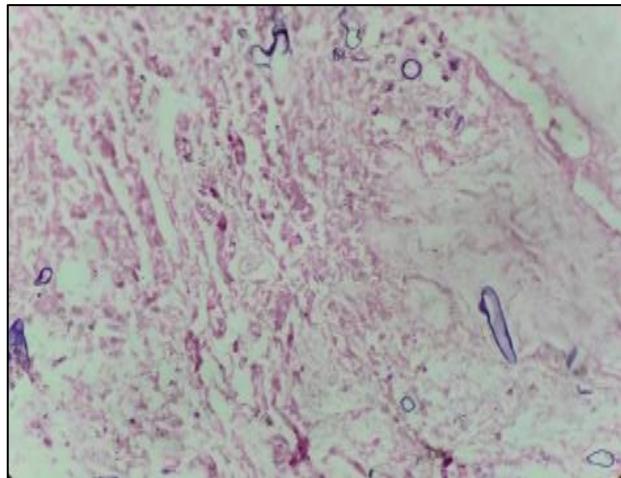
All non-neoplastic polyps were inflammatory polyps with a M:F ratio of 1:1. Histopathologically it showed polypoid structure lined by pseudostratified ciliated columnar epithelium. Underlying stroma was loose, edematous with dilated mucous glands and dense mixed inflammation composed of polymorphs, lymphocytes and plasma cells.

#### *Infective sinusitis (n=25)*

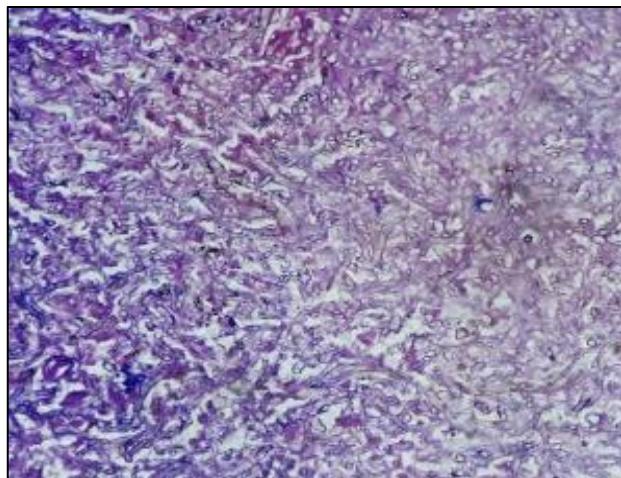
Infective sinusitis (n=25) was the commonest pathology noted in the non-neoplastic category. Majority patients were in 3<sup>rd</sup> to 6<sup>th</sup> decade with M:F ratio of 3.2:1. All cases were of fungal etiology and mucor was the most common organism identified (n=23). Histologically, pseudostratified ciliated columnar epithelium covered soft tissue showed areas of necrosis, neutrophilic infiltrate, congested proliferating blood vessels and edematous stroma. Interspersed were seen irregularly branching, focally collapsed, non-septate hyphae which at places revealed twisting (Figure 1).

The remaining two cases were of aspergillous etiology and histologically showed edematous respiratory tissue with mixed inflammation, necrosis and numerous fungal

elements in the form of thin, septate fungal hyphae which showed acute angle branching with occasional fruiting body (Figure 2).



**Figure 1: Mucormycosis.**



**Figure 2: Aspergillosis**

KOH mount was performed in all suspected cases (n=38) of fungal sinusitis of which 25 were positive for fungal elements. This was further confirmed on histopathological examination. Remaining 13 cases did not show fungal elements and histopathological studies revealed non-specific inflammatory pathology.

#### *Non-specific inflammation (n=13)*

Other than polypoidal lesions and infectious pathology, non-specific inflammation was noted.

### **Benign sinonasal lesions (n=6) (Table 2)**

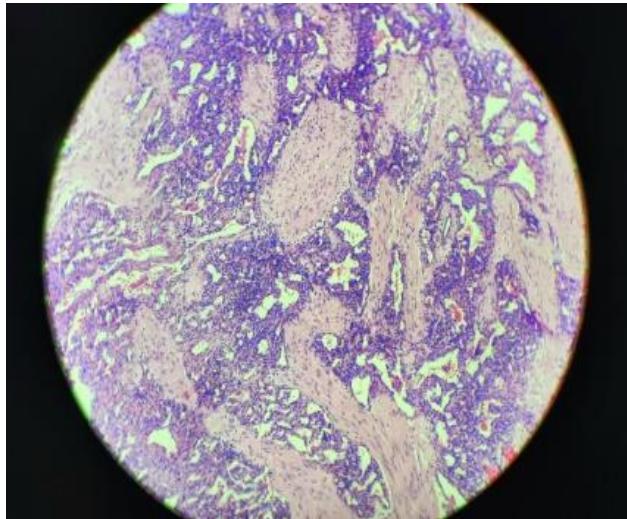
#### *Inverted papilloma/schneiderian papilloma (n=2)*

Both cases were males of 5<sup>th</sup> decade. Histologically lesions revealed hyperplastic squamous epithelial nests

showing downward endophytic growth. Underlying stroma was edematous and showed dense chronic inflammation.

#### *Capillary hemangioma (n=1)*

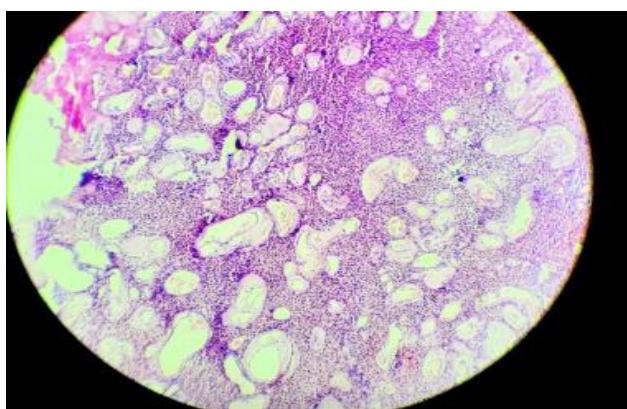
A single case was seen in 60 year old female presenting with nasal obstruction and discharge. Histologically lesion showed proliferation of vascular channels along with surrounding edema and mild inflammation (Figure 3).



**Figure 3: Capillary hemangioma.**

#### *Sinonasal hemangiopericytoma (glomangiopericytoma) (n=1)*

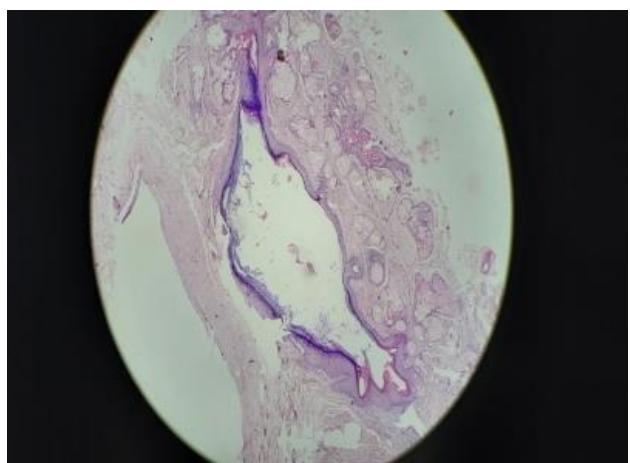
A 65 year old female presented with nasal obstruction. Microscopy showed respiratory epithelium covered soft tissue revealing a well circumscribed vascular tumor comprising thin-walled vascular channels of varying sizes surrounded by sheets of uniform cells with round to oval nuclei. Focal areas of cellular spindling and perivascular hyalinization were also identified. There was no evidence of nuclear atypia or increased mitosis or necrosis. Mitotic activity <2/10 HPF (Figure 4).



**Figure 4: Hemangiopericytoma.**

#### *Dermoid cyst (n=1)*

Single case was observed in young female. Histopathological examination showed a well defined cyst lined by stratified squamous epithelium with mature skin appendages composed of hair follicles and sebaceous glands. Lumen was filled with keratin flakes (Figure 5).



**Figure 5: Dermoid cyst.**

#### *Benign mesenchymal tumor of neural origin (n=1)*

A young female presented with a nodular grey white mass in right nasal cavity. On examination it showed a circumscribed, encapsulated tumor mass comprising of sheets, fascicles of benign spindle shaped cells revealing wavy nuclei. Intervening areas showed hyalinization. Hence it was categorised as a benign mesenchymal tumor of neural origin. There was no evidence of nuclear atypia/increased mitosis/ haemorrhage or necrosis.

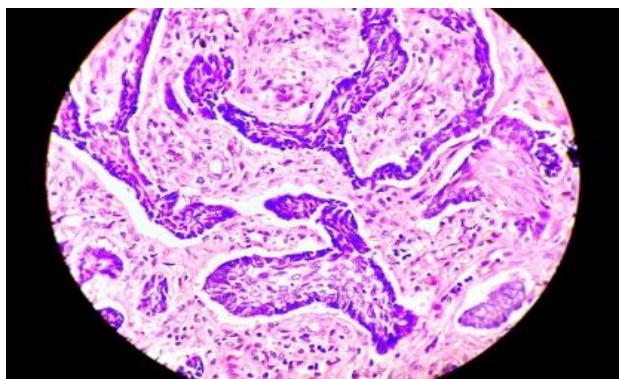
#### *Malignant lesions of nose and paranasal sinuses (Table 3)*

##### *Squamous cell carcinoma (SCC) (n=1)*

A single case of moderately differentiated squamous cell carcinoma was seen in a 42 year female presenting with nasal obstruction. Histologically lesion showed sheets, nests and cords of tumor cells with squamous differentiation with mild to moderate pleomorphism.

##### *Basal cell carcinoma (BCC) (n=1)*

A 50 year old male presented with bilateral nasal lesions. Right nasal cavity revealed a grey white mass and left nasal vestibule showed an ulcerating lesion. Histopathological examination from both the lesions showed basaloid tumor cells arranged in islands, cords and nests showing peripheral palisading and stromal retraction (Figure 6).



**Figure 6: Basal cell carcinoma**

*Small cell undifferentiated neuroendocrine carcinoma (n=1)*

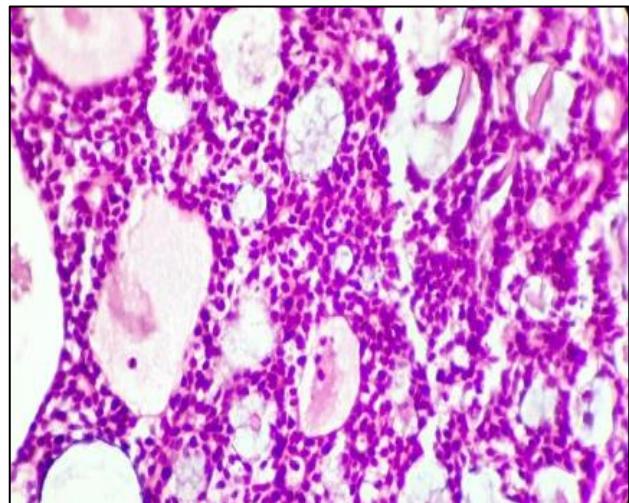
A young male presenting with left nasal growth on examination showed soft tissue covered by respiratory epithelium revealing sheets of small round cells along with areas of necrosis and congested blood vessels. Cells show moderate amount of eosinophilic cytoplasm with hyperchromatic nuclei.

*Atypical paraganglioma (n=1)*

This case showed stratified squamous epithelium covered soft tissue revealing nests of atypical cells showing moderate amount of vacuolated to eosinophilic cytoplasm. Nuclei showed irregular nuclear chromatin and 1-2 prominent nucleoli.

*Adenoid cystic carcinoma (n=1)*

A 38 year old female presenting with right nasal cavity mass. On examination of right medial maxillectomy specimen a tumor was seen predominantly in cribriform pattern with 15-20% solid area. The cribriform spaces were filled with myxoid material and surrounding fibrovascular stroma showed hyalinization (Figure 7). Lymphovascular invasion was present. Perineural invasion could not be identified. Mitoses was <5/10 HPF. All bony margins were free of tumor. Inferior turbinate and superior mucosal margin were involved by tumor.



**Figure 7: Adenoid cystic carcinoma.**

**Table 1: Distribution of non-neoplastic lesions of nose and paranasal sinus (n=46).**

Lesion	N	M	F	M:F	Nasal	Paranasal
<b>Sinonasal polyp</b>	08	4	4	1:1	05	03
<b>Infective sinusitis</b>	25	19	6	3.1: 1	25	-
<b>Non-specific inflammation</b>	13	7	6	1.1: 1	04	09

**Table 2: Distribution of benign lesions of nose and paranasal sinus (n=6).**

Lesion	N	M	F	M:F	Nasal	Paranasal
<b>Inverted papilloma</b>	2	2	0	2:0	+	-
<b>Capillary hemangioma</b>	1	0	1	0:1	+	-
<b>Hemangiopericytoma</b>	1	0	1	0:1	+	-
<b>Dermoid cyst</b>	1	0	1	0:1	+	-
<b>Benign mesenchymal tumor of neural origin</b>	1	0	1	0:1	+	-

**Table 3: Distribution of malignant lesions of nose and paranasal sinus (n=5).**

Lesion	N	M	F	M:F	Nasal	Paranasal
<b>SCC</b>	1	0	1	0:1	+	-
<b>BCC</b>	1	1	0	1:0	+	-
<b>Small cell undifferentiated neuroendocrine carcinoma</b>	1	1	0	1:0	+	-
<b>Atypical paraganglioma</b>	1	1	0	1:0	+	-
<b>Adenoid cystic carcinoma</b>	1	0	1	0:1	+	+

## DISCUSSION

Masses in nasal cavity and paranasal sinuses form a heterogeneous group of lesions with a broad spectrum of histopathological features. Non-neoplastic and benign sinonasal disorders account for major proportion of visits to the hospital. A variety of these non-neoplastic and neoplastic lesions are quite impossible to differentiate clinically.<sup>2</sup> This lack of differentiation of benign and malignant disorders at presentation leads to significant delay in the initial diagnosis and therapy.

In the present study male predominance was noted demonstrating a male to female ratio of 1.4:1. Studies by Parmar et al, Garg et al and Zafar et al showed similar findings.<sup>3-5</sup>

Majority cases occurred in 4<sup>th</sup>-5<sup>th</sup> decades which was in concordance with Alam et al whereas Garg et al and Bakari et al observed that 2<sup>nd</sup> and 3<sup>rd</sup> decade were most vulnerable periods.<sup>4,6,7</sup> Malignant lesions were commonly reported in 5<sup>th</sup> to 6<sup>th</sup> decade as also found by Patel et al.<sup>8</sup>

The commonest clinical presentation of sinonasal lesions was nasal discharge, nasal stuffiness/obstruction comparing favourably with other studies.

Non-neoplastic lesions made 80.7% of the total cases of nasal cavity and paranasal sinuses in our study. Similarly, a high proportion of non-neoplastic lesions are also reported by Garg et al 81.6% and Zafar et al revealing 89% of non-neoplastic lesions in their study.<sup>4,5</sup>

Among non-neoplastic lesions fungal infection was the commonest lesion contributing to 54.3% of cases in present study, amongst which mucor was the causative organism in majority of cases (92%). However, this was not the case in other studies. Pamar et al revealed only 3.75% cases and Vartak et al reported 6.7% of cases. This discordance is attributed to the overlap of study period with COVID-19 pandemic.<sup>3,9</sup>

All cases of sinonasal polyps were inflammatory polyps in present study which is comparable with Vartak et al.<sup>9</sup>

There were 2 cases of inverted papilloma in present study which was also seen in study by Kulkarni et al.<sup>10</sup> Both were males in 5<sup>th</sup> decade with lesion in nasal cavity. Findings also correlated with Khan et al and Vartak et al who found peak age of patients in 5<sup>th</sup> decade with male preponderance.<sup>9,11</sup>

One case of lobular capillary hemangioma (LCH) was encountered in present study which presented as bleeding nasal polyps. Parmar et al reported 3 cases of hemangioma in his study. One case of hemangiopericytoma was observed in present study, similar observations were made by Parmar et al and Seema et al.<sup>3,12</sup>

Nasal dermoid cysts constitute 3.7%-12.6% of all head and neck dermoid cysts and 1%-3% of all dermoid cysts on the whole body. The majority are diagnosed early in life, before 3 years of age. Most commonly, it occurs on the 1/3 lateral of the eyebrow, followed by the orbital and nasal regions.<sup>13</sup> One case of dermoid cyst was identified in present study in 21 year female presenting with nasal obstruction. Similar presentation was seen in a study by Ülkü et al in a 41 year female.<sup>14</sup> Although nasal dermoid cysts are rare in adults, they should be considered in the differential diagnosis of cystic masses in the nasal area, and the intracranial connection should be determined radiologically before the operation.

One case of benign mesenchymal lesion of neural origin was identified in present study in a young female which is in close correlation with findings of Kulkarni et al who identified a single case of schwannoma.<sup>10</sup> Solitary nasal schwannomas are rare and lesions presenting as PNS and NC schwannomas account for 4% of head and neck schwannomas. Other benign mesenchymal lesions encountered in nasal cavity include including LCH, SFT, sinonasal inflammatory polyp, glomus tumor, fibromatosis, juvenile nasopharyngeal angiofibroma (JNA), leiomyoma, schwannoma, neurofibroma, meningioma.<sup>15</sup>

Malignant lesions of sinonasal tract are rare.<sup>16</sup> Malignant polypoidal lesions masquerade as simple nasal polyps or chronic inflammatory masses, causing delay in the diagnosis. Squamous cell carcinoma is the commonest histological type.<sup>17</sup> Chief complaints are primarily nasal obstruction, facial pain, rhinorrhea, and epistaxis (bleeding). Approximately 50% arise in the nasal cavity, and 50% in the paranasal sinuses predominantly the maxillary sinus.<sup>18</sup> Present study showed single case of SCC in 42 year female who presented with nasal obstruction. Kulkarni et al and Parmar et al reported 2 cases of SCC each.<sup>3,10</sup> One case of BCC was also observed in present study which is in concordance with Parmar et al, who reported 3 cases of the BCC in her study.<sup>3</sup>

Present study had a single case of adenoid cystic carcinoma. Similar findings were seen in study by Kulkarni et al.<sup>10</sup> Adenoid cystic carcinoma is the most frequent histology, accounting for about 10% to 18% of sinonasal tumors, and it is preferentially located at the level of the maxillary sinus and nasal cavities. They show cribriform architecture in 50% of cases while remaining cases have tubular or solid architecture. Present study showed mass in right nasal cavity involving maxillary sinus causing nasal obstruction and predominant cribriform architecture on histopathology. Panchal et al had the incidence of 17.8% of adenoid cystic carcinoma. In general, these are more frequent than the usual adenocarcinomas and are aggressive tumors, but with a better outcome as compared to similar tumours arising elsewhere in the head and neck region.<sup>19,20</sup>

## Limitations

This study was carried out on a small number of cases. Studies on larger number of cases are needed for extrapolation of results on general population.

## CONCLUSION

Sinonasal lesions have non-specific clinical presentation. This commonly leads to diagnostic and therapeutic dilemma. Histopathological examination being gold standard, acts as an important link between presentation and management. This study not only displays the spectrum of sinonasal lesions but also emphasizes the role of histopathology and its contribution towards a wholesome clinicopathologic diagnosis.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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