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**HISTOPATHOLOGICAL SPECTRUM OF SINONASAL MASSES –A STUDY OF 162 CASES.**

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**ABSTRACT**

**Introduction:** Lesions of the sinonasal region are commonly encountered in clinical practice and important from clinical and pathological perspectives as they have a varieties of histological patterns.

**Aims and Objectives:** 1) To study the incidence of benign and malignant lesions of sinonasal region. (2) To study distribution of various lesions for sex differences and symptomatology. (3) To compare the findings of the study with other studies.

**Methods:** Present study included 162 polypoidal lesions of the nasal cavity. The study period constituted from December 2011 to October 2012. All the tissues were fixed in 10% buffered formalin, processed, stained with H & E and studied for various histopathological patterns. Periodic acid Schiff's and reticulin stains were used wherever necessary.

**Results:** Among 162 cases, 110 cases (67.11%) were nonneoplastic and 52 cases (32.09%) were neoplastic. Among the non-inflammatory lesion, nasal polyp (83.64%) was the commonest lesion followed by fungal infection. Benign tumours (69.23%) were more frequent than malignant tumours (30.77%). Among benign neoplastic lesions, angiofibroma (41.67%) was commonest and hemangioma (19.4%) was the next common lesion. All lesions were common in second and third decades, with male predominance. Malignant lesions were comparatively less to that of benign lesions. Squamous cell carcinoma was most common malignant lesion.

**Conclusion:** Categorizing the sinonasal lesions according to histopathological features into various types, helps us to know the clinical presentation, treatment, clinical outcome and prognosis of the disease, so all polypoidal lesions need histological examination.

**Keywords:** Nonneoplastic, Neoplastic, Benign, Malignant.

**INTRODUCTION**

Sinonasal lesions are common lesion encountered in clinical practice and important from clinical and pathological perspectives as they give rise to a varieties of histological patterns and grades of malignancies.

The presence of mass in the nose is a seemingly simple problem; however, it raises numerous questions about differential diagnosis. Although neoplasms of the nose and paranasal sinuses are not common, they are of interest because of their various types. It has been found, the nose and

paranasal sinuses account for less than 1% of all malignant tumors in general, not more than 3% of the head and neck region malignancies.

It may be due to the most often occurring simple nasal polyps or polypoidal lesions due to various other pathological entities ranging from infective granulomatous disease to polypoid neoplasm including the malignant ones. The nose and nasal sinuses are exposed to various infections, chemically irritating, antigenically stimulating, mechanically, traumatic and undoubtedly many other influences. Consequences of these

multifaceted deleterious exposures include the formation of tumor like and truly neoplastic conditions [1]. Clinically sometimes, it becomes quite impossible to distinguish between inflammatory conditions presenting as simple polyps, polypoidal lesions due to specific disease and polypoid neoplasm (benign and malignant). Therefore it becomes important that all polyps and polypoidal lesions should be submitted for histopathological examination.

Nasal polyps are defined as prolapsed lining of the nasal sinuses. They are essentially rounded projections of edematous membrane [2]. They are often bilateral and multiple which lead to visible broadening of nose [3]. The commonest site of origin is in the ethmoidal labyrinths, particularly from the mucosa of middle turbinate [4]. Nasal polyps most often occur in middle aged males. M:F ratio is 3:1 [3]. The symptoms of tumors of nose and paranasal sinuses often masquerade as chronic inflammatory condition. Even though these malignant neoplasms have extremely low incidence, they have a long clinical history with frequent local recurrence and they cause relatively great amount of morbidity. In nasal cavity, tumors of various type have a tendency to become polypoid. Thus an epithelial papilloma of the nasal cavity often resembles a nasal polyp. Some lesions are specific to certain location, for e.g., epithelial papilloma of turbinate, juvenile angiofibroma of nasopharynx. Thus the study was undertaken to study the histopathology and classify the lesions of nasal cavity and to study the relative distribution of various lesions for age and sex.

## MATERIAL AND METHODS

This study comprised of 162 consecutive cases, the specimen of which were received in the histopathology section of the Dept. of Pathology of our institution with the clinical diagnoses of 'Nasal polyp' from January 2012 to October 2012. The age and sex of the patients were recorded. The consent of all the patients included

in the study was taken. The tissues were routinely processed for histopathological sections and were stained by H&E stain. Special stains by Reticulin and PAS methods were undertaken wherever applicable. The cases were classified into Nonneoplastic and Neoplastic lesions. The Neoplastic lesions were further classified according to WHO classification on histopathological examination. (Shanmugaratnam 1978)[5].

## RESULTS AND OBSERVATIONS

Histopathological examination revealed that out of 162 cases clinically diagnosed as nasal polyp, there were 110 cases (67.11%) with different types of nonneoplastic lesions and 52 cases (32.09%) of neoplastic ones. Among the 52 neoplastic lesions, there were 36 cases (69.23%) of benign tumors and remaining 16 cases (30.77%) were malignant in nature.

Inflammatory polyp was the commonest lesion observed in this region. It constituted 83.64% (92 cases) of all nonneoplastic cases. The other nonneoplastic lesions in the decreasing order of frequency were fungal infection (7 cases, 6.36%), mucormycosis (4 cases, 3.64%), rhinosporidiosis (2 cases, 1.82%), rhinoscleroma (2 cases, 1.82%), non-specific inflammation (2 cases, 1.82%) and one case (0.91%) of Wegner's granulomatosis was seen.

Inflammatory polyp was the most common lesion involving this region. The age range of patients was 10 to 80 years, but peak was seen in 2<sup>nd</sup> to 4<sup>th</sup> decade of life. These polyps were typically bilateral in 62% cases.

The patients presented with symptoms of nasal stuffiness and obstruction and mass protruding from the nostril. Other symptoms were total and partial loss of smell, headache due to sinusitis, sneezing, and mucoid or watery discharge. On examination, the mass was glistening grape-like, insensitive to probing and did not bleed on touch. Microscopically, the polyps were composed of loose mucoid stroma and mucus glands, covered

by respiratory epithelium. The stroma was infiltrated by lymphocytes, plasma cells, neutrophils and eosinophils. Allergic nasal polyps show abundant eosinophils in the stroma as well as the other inflammatory cells.

Fungal infections were more common in 3<sup>rd</sup> and 4<sup>th</sup> decade. They presented with foul smelling nasal discharge, which on microscopy, showed inflammation ranging from negligible to large number of neutrophils and histiocytes within granulation tissue. Most common fungal infection was Aspergillosis.

Mucormycosis was more common in 5<sup>th</sup> decade with male preponderance. Microscopically, there was formation of non-invasive mycetomas/fungus balls.

Rhinosporidiosis was present in 5<sup>th</sup> and 6<sup>th</sup> decade. The diagnosis was made by the identification of many globular cysts reaching up to 200 nm in diameter. Each of these cysts represented a thick-walled sporangium containing numerous spores.

Rhinoscleroma was present in 5<sup>th</sup> decade with male predominance. Microscopically, the predominant cells were foamy macrophages (Mikulicz cells) and plasma cells.

Other nonneoplastic lesions include non-specific inflammation which were observed in 65 years old male and 45 years old male patients & Wegner's granulomatosis which was present in 17 years old male which on examination, showed a leukocytoclastic vasculitis with geographic necrosis surrounded by palisaded histiocytes, lymphocyte-poor granulomatous reaction, and epithelial ulceration.

### Neoplastic lesions

Among the 52 cases of neoplastic lesions, there were 36 benign cases (69.23%) and 16 malignant ones (30.77%).

Angiofibroma and hemangioma were the most common lesions observed in the benign group. There were 15 cases (41.67%) of angiofibroma. It was more common in the 2<sup>nd</sup> decade and there

was marked male preponderance in this type of neoplasm. Microscopically, it was composed of an intricate mixture of blood vessels and fibrous stroma. Next common benign neoplasm was hemangioma with 7 cases (19.4%). It was more common in 3<sup>rd</sup> to 5<sup>th</sup> decade with male to female ratio of 1:1.33.

There were 4 cases (11.1%) each of squamous papilloma and inverted papilloma, which commonly presented with mass, nasal obstruction, or epistaxis. Microscopically, papillomas were composed of proliferating columnar and/or squamous epithelial cells, with an admixture of mucin-containing cells and numerous microcysts, but inverted papilloma has invaginations of the surface epithelium into the underlying stroma.

Other neoplastic lesions include 3 cases (8.33%) of fibrous dysplasia, one case (2.78%) each of cement-ossifying fibroma, neurilemmoma and plasmacytoma. The distribution of cases has been shown in table no -1.

The distribution of the malignant neoplastic lesions has been depicted in table no -2.

Squamous cell carcinoma was the commonest malignant lesion observed, which was most common in 6<sup>th</sup> and 7<sup>th</sup> decade. There was histological evidence of squamous differentiation, in the form of extracellular keratin or intracellular keratin and/or intercellular bridges. The tumour cells were arranged in nests, masses, or as small groups of cells or individual cells.

One case of transitional cell carcinoma was present in 40 years old male and one case of adenocarcinoma was present in 50 years old male. Microscopically in adenocarcinoma, a well differentiated seromucinous composition and tubulopapillary architecture was seen.

Next common was the hemangiopericytoma with 2 cases (12.5%) both in males. Microscopically, the lesions appeared vascular and highly cellular, oval tumor cells arranged themselves around blood vessels but they had little atypia, necrosis, or mitotic activity.

Other malignant neoplastic lesions include acinic cell carcinoma with 2 cases (12.5%) both in females and one case (6.25%) each of chondrosarcoma, rhabdomyosarcoma and teratocarcinoma which were present in 42 years old male, 28 years old male and 30 years old female respectively.

## DISCUSSION

Polypoidal masses in the nasal cavity form a complex group of lesions with a wide spectrum of histopathological features. While there are many nonneoplastic lesions including mainly the allergic and inflammatory one, there are also good number of neoplastic tumefaction in the nose and nasal sinuses. These lesions are often quite impossible to distinguish clinically and are labelled as nasal polyp[6]. Histopathological examination of such polypoidal masses show a spectrum of lesions ranging from nonneoplastic ones to neoplastic tumors including benign and malignant neoplasms.

The true nasal polyps are the tumor like nonneoplastic polypoidal masses arising from nasal cavity and sinuses. Two types are encountered- one is associated with nasal allergy and another with numerous inflammatory or granulomatous polyp.

In our study, we have observed 110 cases (82.06%) of nasal polyps. The incidence of nasal polyps was slightly higher in this study (82.06%) compared to the observations by Tondon et al (64%) and Anjali et al (62.85%) [7]. The age range of the patients was from 10 to 80 years. Most commonly patients are in 2<sup>nd</sup> to 3<sup>rd</sup> decade which is comparable with Ghosh and Bhattacharya (1966) [8] and Zafar et al (2008[9]). There is male preponderance with male to female ratio of 1.53:1 which was same as that observed by Zafar et al and Dasgupta et al [6,7]. Although adolescence or early childhood is stated to be the commonest age of occurrence, there are reports of this disease occurring in all age groups (Maloney and Collins 1977, Fechner 1990)[10,11]. Nasal

polyps were bilateral in 60% cases in our study, while according to Batsakis bilateralism was the rule [12].

In our study, 7 cases (6.36%) of fungal infection were found in the age group of 20-60 years with male predominance which is comparable with Ghosh and Bhattacharya [8].

In our study, 4 cases (3.64%) of mucormycosis were found with peak in the 5<sup>th</sup> decade with male predominance. This findings were similarly observed by Dafale et al [13].

The incidence of Rhinoscleroma in our study (1.82%) was same as that observed by Zafar et al [9], but lower than that observed by Tondon et al (9% of all inflammatory lesions). In the study by Tondon et al [7], younger peak age of presentation was noted (20-29 years) compared to our observation where the peak age was in 5<sup>th</sup> decade, however, the sex ratio was almost the same (1:25).

Rhinosporidiosis consisted of 1.82% of all the neoplastic lesions which was similar to that observed by Bjerregaard et al (1992) [14] in which incidence was 3.3%. This chronic granulomatous disease caused by rhinosporidiosis seeberi, often present as polypoidal mass that develop on nasal mucosa. This lesion is common in the endemic zones of India including West Bengal (Sammaddar and Sen 1990)[15].

Wegener's granulomatosis (WG) is a multisystemic disease characterized by a necrotizing granulomatous vasculitis affecting predominantly the lower and upper respiratory tract, lung and kidneys [16]. The prevalence of the disease is about 3 persons per 100,000 people, equally in both sexes. We found one such case in 17 years old male.

In our study, out of 110 nonneoplastic lesions, 2 cases were of nonspecific inflammation. This was probably because of wrong site or inadequate biopsy.

Angiofibroma were the most common benign tumor in our study. Juvenile angiofibroma are the

characteristic lesions with blood filled spaces separated by excessive fibrous tissue occurring chiefly in the adolescent males [16]. Angiofibroma in our study constituted 41.67% of cases and occurred mainly in the young people, mainly the cases of juvenile angiofibroma, occurring in the pubertal age group and predominantly in males.

Hemangioma were second most common benign neoplasm observed in the present study and constituted 19.4% of cases as observed by Bjerregaard *et al*(1992)[14] and more common in 3rd to 5th decade as documented by Sayed and Al-Serhani *et al*[17]. These neoplasms presented as bleeding nasal polyp. This was observed in the young as well as elderly people. Willis (1962) has regarded this neoplasm as hamartoma or malformation rather than true neoplasm, but occurrence of such lesions in elderly people with a history of less than 6 months duration is against the theory of hamartomatous origin.

Papillomas in the nose and nasal sinuses are stated to be commonly occurring benign epithelial neoplasm. This group includes squamous papilloma and inverted papillomas. Such lesions were more common in adult males (Oberman 1964) [18]. We have also observed 8 such cases (22.22%) and they were three folds more common in the males. Similar observations were made Tondon *et al* (1971) [7]. Maximum number of cases occurred in 4<sup>th</sup> and 5<sup>th</sup> decade comparable to study by Panchal *et al* (2005)[19]. According to Tsai *et al*[20], fibrous dysplasia in nasal cavity is rare. However, we found 3 cases (8.33%). Microscopic features were similar to fibrous dysplasia at other sites and consistent with Ruggieri *et al* and Tsai *et al* showing narrow, curved misshaped discontinuous woven bone trabeculae having a characteristic fishhook configuration, interspersed with fibrous tissue of variable cellularity. The woven bone trabeculae were not surrounded by osteoclasts.

According to Jayachandran and Meenakshi [21], cement-ossifying fibroma is a rare benign, non-

odontogenic tumor like lesions, a subdivision of fibro-osseous lesions. The age of occurrence is between 20 to 40 years with male to female ratio of 1:2. In our study, one case (2.78%) was seen in maxilla of a 35 year old female. The most striking feature if this lesion on microscopy was the presence of large, sharply defined, irregularly shaped, calcified spherules set in a densely fibrotic stroma.

Neurilemmoma arising in the nasal cavity are rare. We encountered one case (2.78%) of neurilemmoma, in a female aged 13 years. A different study found neurilemmoma in less than 4% of cases [22]. Histology revealed uniform spindle cells arranged in loose stroma (Antoni B.) Nuclei were arranged in a palisaded pattern (Verocay body). Similar observations were made by another study.

Extramedullary plasmacytomas are uncommon tumors, with a worldwide annual incidence of 3 per 100,000 population. They account for 1% of all tumors of the head and neck and 4% of all nonepithelial tumors of the nasal tract [16]. We encountered one such case in 30 years old female. The malignant polypoid tumors of nose and nasal sinuses constitute an important and varied group. Often to, these lesions simulate the simple nasal polyps or chronic inflammatory disease and thus delay in the diagnosis. Malignant tumors in this location are not common in our country (Jussawalla *et al* 1984, Chaturvedi *et al* 1986)[23], however carcinomas are, by far, the commonest malignant lesion. In our series, we have observed 38 carcinomas (92.75%) out of 41 malignant lesions. The commonest carcinoma of the nose and sinuses is the squamous cell carcinoma.

Squamous cell carcinoma constituted 43.75% of cases in our study. Comparable findings were observed by Panchal *et al*(2005) [19] and Bjerregaard *et al*(1992)[14]. SCC was more common in 6th to 7th decade with male to female ratio of 1.67:1 as documented by Ghosh and Bhattacharya[8].

Transitional cell carcinoma and adenocarcinomas also occur but are less frequent (Frazel and Lewis 1963). Adenocarcinoma constituted 6.2% of all cases and was present in 50 years old male. Similar findings were observed in study by Panchal *et al* (2005) [14]. Transitional cell carcinoma constituted 6.2% of cases with presentation in 40 years old male.

Tumors of minor salivary gland origin occur in nose as well as nasal sinuses, large majority of such tumors are malignant. Acinic cell carcinoma however was rare and found only in 2 cases. Only 3 cases were belonged to the sarcoma group in our study, consisting of one case each of chondrosarcoma, rhabdomyosarcoma and teratocarcinosarcoma. Such malignancy of connective tissue origin are rare but can present as primary neoplasm of nose and paranasal sinuses. (Birt 1930, Manon and Soule 1965) [24]. Rhabdomyosarcoma involves the head and neck region in 40 to 45% of cases. The sinonasal tract is involved in about 10% of cases affecting the head and neck. We encountered a case of rhabdomyosarcoma in 28 years old male. Teratocarcinosarcomas in the nose, sinuses, or nasopharynx have various elements resembling immature neuroepithelial tissue, including (a) well-formed glands lined with atypical epithelium, (b) nonspecific myxoid tissue, (c) rhabdomyosarcomatous differentiation, (d) benign and malignant cartilage, and (e) cellular areas [16]. We encountered one such case in 30 years old female.

Hemangiopericytoma is a rare angiogenic tumor accounting for only 5% of total cases. We observed two such cases one in 52 years old male and 29 years old male.

## CONCLUSION

To conclude, classifying the sinonasal lesions according to histopathological features into various types, helps us to know the clinical presentation, treatment, clinical outcome and prognosis of the disease.

Although most of nasal polyps sent for histopathology are inflammatory, secondary to infection or allergy, various benign and malignant lesions of nose may present as polypoidal masses, so all polyps need histopathological examination.

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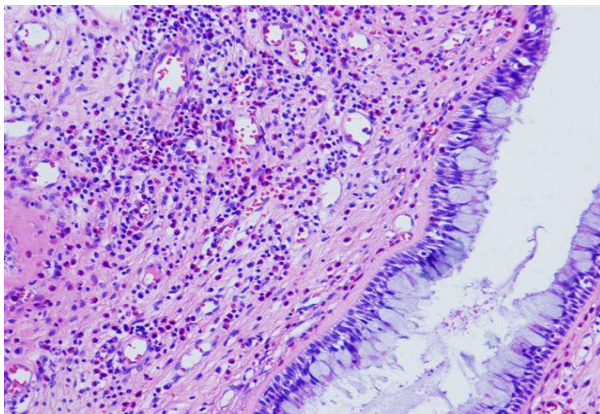
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**Table 1-Non-neoplastic lesions**

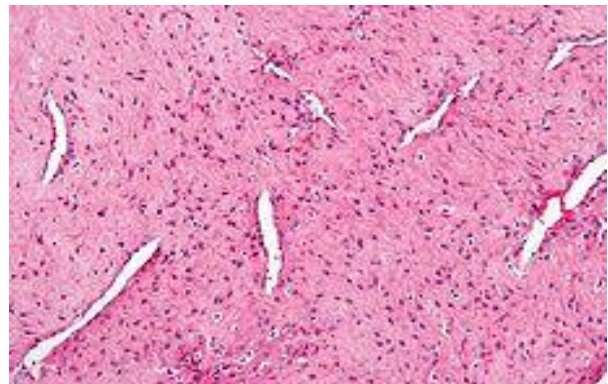
Diagnosis	No.	%	Male	Female	Age range in years (Average)
<b>Inflammatory polyp</b>	92	83.64	60	42	10-80
<b>Fungal infection</b>	7	6.36	4	3	26-60
<b>Mucormycosis</b>	4	3.64	4	-	42-68
<b>Rhinosporidiosis</b>	2	1.82	1	1	41-70
<b>Rhinoscleroma</b>	2	1.82	2	-	45-46
<b>Non-specific inflammation</b>	2	1.82	1	1	63-74
<b>Wegner's granulomatosis</b>	1	0.91	1	-	

**Table 2-Neoplastic lesions**

Diagnosis	No.	%	Male	Female	Age range in years (Average)
Benign	36	69.23			
Angiofibroma	15	41.67	15	-	10-39
Hemangioma	7	19.4	3	4	21-60
Squamous papilloma	4	11.1	3	1	28-38
Inverted papilloma	4	11.1	3	1	42-73
Fibrous dysplasia	3	8.33	-	3	16-28
Cement-ossifying fibroma	1	2.78	1	-	35
Neurilemmoma	1	2.78	-	1	13
Plasmacytoma	1	2.78	-	1	30
Malignant	16	30.77			
Squamous cell carcinoma	7	43.75	4	3	41-76
Transitional cell carcinoma	1	6.25	1	-	40
Adenocarcinoma	1	6.25	1	-	50
Acinic cell carcinoma	2	12.5	-	2	38-58
Chondrosarcoma	1	6.25	1	-	42
Rhabdomyosarcoma	1	6.25	1	-	28
Teratocarcinosarcoma	1	6.25	-	1	30
Hemangiopericytoma	2	12.5	2	-	29-52

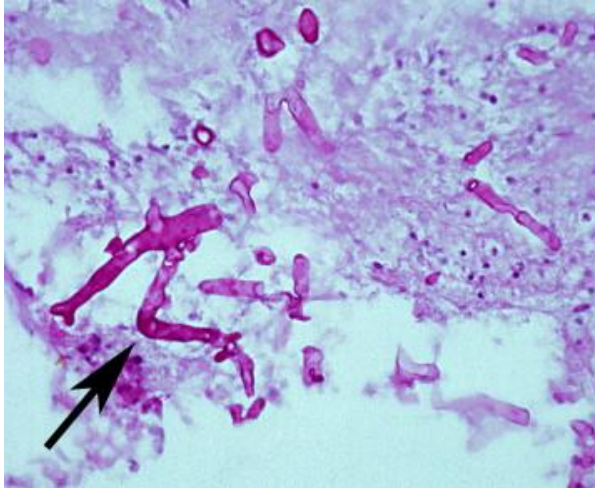


Inflammatory polyp : Proliferation of tubular glands lined by ciliated, respiratory-type epithelium and goblet cells, without nuclear atypia. The stroma is edematous with inflammatory cells and eosinophils

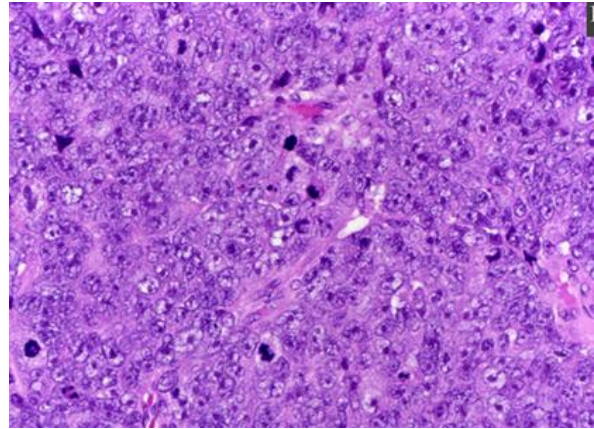


Angiofibroma





Mucormycosis. Hyphae are broad, often distorted and frequently appear twisted. Branching is right-angled (arrow) and septae are absent (PAS stain).



Non-keratinizing Squamous cell carcinoma- showing many broad, interconnecting bands of neoplastic epithelium without keratinization characterizes this lesion and pleomorphic cells with loss of polarity and marked mitotic activity are present (H&E section)