

## A histomorphological study of the neoplastic polypoidal masses of the nasal cavity, paranasal sinuses, and nasopharynx

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### Abstract

**Introduction:** Mass in the nasal cavity is a fairly common finding in clinical practice. A wide array of neoplastic and non-neoplastic conditions present as a mass in the nasal cavity, paranasal sinuses and nasopharynx. Clinically, it can be quite difficult to distinguish between simple nasal polyps, polypoidal lesions due to specific diseases, and polypoidal neoplasms. Hence histopathological examination of all nasal polyps is very important to arrive at a specific diagnosis and appropriate treatment.

**Purpose:** The aim of this study was to analyze the histopathological patterns of polypoidal lesions in the nose, paranasal sinuses, and nasopharynx.

**Methods:** The study was carried out retrospectively from June 2009 to June 2011 and continued prospectively for a period of one year from June 2011 to June 2012. The retrospective cases were taken from records of the pathology department of a tertiary care hospital. The blocks were re-cut and sections were stained using hematoxylin and eosin. Special staining was done whenever necessary depending on the lesion and studied microscopically.

**Observations and Results:** A total of 100 cases presented as polypoidal lesions of nose and paranasal sinuses. Out of the 100 polypoidal masses, 42 were diagnosed as neoplasms among which 28 cases were benign and 14 cases were malignant. The benign spectrum included angiofibroma, inverted papilloma, capillary hemangioma and pyogenic granuloma. Malignant cases included mostly squamous cell carcinoma followed by poorly differentiated carcinoma, adenocarcinoma and a single case of plasmacytoma.

**Conclusion:** Polypoidal masses in the nasal cavity, paranasal sinuses, and nasopharynx represent a large variety of neoplastic lesions of benign and malignant pathologies.

**Keywords:** Polypoidal lesions; Nasal polyp; Nasal and paranasal sinuses; Nasopharynx; Nasal neoplasm

### Introduction

Nasal polyps are polypoidal masses arising from mucous membranes of nose and paranasal sinuses. Polypoidal masses in the nose and nasal sinuses are very common lesions encountered in clinical practice. A patient may come with the complaint of nasal obstruction, nasal discharge, epistaxis, and/or allergic symptoms such as sneezing or rhinorrhea. Despite its long history and frequent occurrence, many questions still exist with regard to incidence, pathogenesis, and treatment. A large number of specific diseases arise from the specialized tissues in these anatomical areas, i.e. Schneiderian papillomas in the nasal cavity, intestinal type of adenocarcinomas in the paranasal sinuses, angiofibromas and lymphoepitheliomas in the nasopharynx, etc.<sup>(1)</sup> Clinically, it may be difficult to distinguish between simple nasal polyps, polypoidal lesions due to specific diseases and polypoidal neoplasms. Hence, a histopathological examination of all nasal polyps is important to arrive at a specific diagnosis and thereby suggest an appropriate treatment regimen.

### Materials and Methods

A two year retrospective study was carried out in the Department of Pathology in a tertiary care hospital from 2009 to 2011. The study was continued prospectively for a period of one year from June 2011 to June 2012. All

the specimens sent as polypoidal lesions of nasal and paranasal sinuses or of nasopharynx were studied. The sections were stained with the routine hematoxylin and eosin (H&E) stains and were followed by special stains wherever required. A histopathological diagnosis of each lesion was made after careful evaluation of the tissues. Descriptive statistical measures like percentages and proportions were used to analyze the data.

### Results

A total of 100 biopsies sent from the ENT Department were reviewed by the Department of Pathology, Vydehi Institute of Medical Sciences and Research Center over a period of 3 years from June 2009 to June 2012. Though most patients presented with multiple symptoms, a majority came with the chief complaint of nasal obstruction (55 cases). Nasal discharge was another frequent complaint (47cases), of which 35 patients had mucopurulent discharge and 12 patients had watery discharge. Epistaxis was noted in 26 patients and allergic symptoms such as sneezing and rhinorrhea were seen in 10 cases. Out of 100 polyps and polypoidal lesions, 24 cases presented with bilateral involvement. Histopathological examination of the cases revealed that simple nasal polyps constituted 51 cases and polypoidal like lesions constituted 49 cases.

Of the 49 polypoidal lesions, 6 (12.2%) were infectious, 42(85.8%) were neoplastic and 1 was a

benign non neoplastic lesion. Out of 42 neoplastic polypoidal lesions, 28(66.67%) were benign and 14 (33.33%) were malignant neoplasms. Angiofibromas (12 cases) and inverted papillomas (nine cases) were the most frequent benign tumors followed by capillary hemangioma (three cases). The other benign tumors included two cases of pyogenic granuloma, one nasal papilloma, and one fibroepithelial polyp (Table 1). Majority of benign polypoidal lesions were seen in the third decade with male predominance (male: female ratio 6:1). Among the malignant lesions, six cases of squamous cell carcinoma and five cases of poorly differentiated carcinoma were detected. Furthermore, two cases of adenocarcinoma and a solitary case of plasmacytoma (presenting in the first decade) were diagnosed. Squamous cell carcinoma was seen in the elderly (6th decade). All the malignant polypoidal lesions occurred in males except for a case of adenocarcinoma which occurred in a female patient.

## Discussion

Polyps and polypoidal masses in the nose, nasopharynx and paranasal sinuses are very common lesions encountered in clinical practice. It may be simple nasal polyps or polypoidal lesions due to a wide range of pathological conditions ranging from infective granulomatous disease to polypoidal neoplasms. The nose, paranasal sinuses, and nasopharynx are exposed to a variety of infectious agents, chemical/mechanical irritants, and antigenic stimulants from local trauma or other sources (i.e. foreign body).

In our study, sinonasal masses had a predilection for males, demonstrating a male to female ratio of 1.7: 1 (Table 2). Similarly, studies conducted by Lathi et al<sup>(2)</sup> (male: female ratio of 1.6: 1) and Zafar et al<sup>(3)</sup> (male: female ratio of 2: 1) also showed a male preponderance. However, another study by Bakari et al<sup>(4)</sup> from Nigeria revealed a female preponderance of 1.2: 1.

Most of our cases occurred between the ages of 10-65 years (Table 3). The majority of patients belonged to the 2<sup>nd</sup> to 4<sup>th</sup> decades of life, representing 23 cases of nasal polyps and 27 cases of polypoidal lesions. Malignancies were generally found after the 4th decade. In the study done by Lathi et al,<sup>(2)</sup> the 2<sup>nd</sup> to 4<sup>th</sup> decades of life were the most vulnerable period for the development of sinonasal masses. The present study also coincided with the studies done by Bakari et al<sup>(4)</sup> and Zafar et al<sup>(3)</sup> with the peak age of incidence in their studies being 33 years & 22.5 years respectively.

The most common presenting complaint was nasal obstruction, which was seen in 55cases. The other symptoms and signs included sensation of a mass in the nasal cavity in 29 cases, allergic symptoms like sneezing, rhinorrhea in 10 cases, nasal discharge in 47 cases and epistaxis in 26 cases which compares favorably with findings from other studies.

## Comparison of Histopathological Findings

**Benign Polypoidal Lesions:** Most of the benign tumors were seen between 21 to 30 years of age, and they were more common in males than females.

**Haemangiomas:** Three cases of capillary hemangiomas were reported in the present study seen in the 2<sup>nd</sup> decade and with male predominance. However, according to Friedmann, hemangiomas were common in the fifth decade with no particular sex difference.<sup>(5)</sup> In a study by Dasgupta et al, hemangiomas were one of the commonest benign lesions (59 cases or 45.7%). They usually presented as a bleeding nasal polyp mostly among male patients (male: female ratio 2:1).<sup>(6)</sup>

Clinically, it presents as a smooth, lobulated, polypoid red mass measuring up to 1.5 cm in diameter. In most cases, the presenting complaint was epistaxis with or without nasal obstruction. Microscopically all capillary hemangiomas were composed of lobules of proliferating capillaries lined by normal endothelial cells.

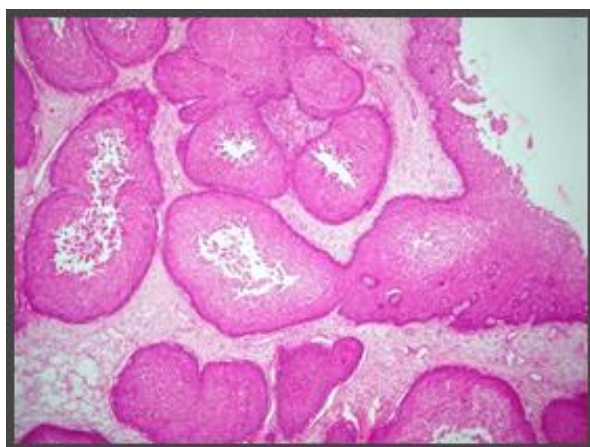
**Angiofibroma:** In the present study, we encountered 12 cases (42.85%) of angiofibromas. The age group ranged from 11-60 years with majority of the cases seen in 3<sup>rd</sup> decade and in males. Common complaints were unilateral nasal obstruction and bleeding. In a study by Kapadia et al, angiofibroma was seen exclusively in adolescent males, between 10-17 years of age. Unilateral or bilateral nasal obstruction and recurrent epistaxis were the most common symptoms.<sup>(7)</sup>

In a study by Dasgupta et al, 30 cases (23.2%) of angiofibromas were encountered, over a wide age range (10 – 55 years) and were mainly seen in males (mean age 23.4 years).<sup>(6)</sup> Microscopically the lesions showed increased vascularity, with numerous slit-like or gaping blood vessels along with sheets of fibroblasts.

**Inverted Papilloma:** In the present study, there were 9 cases (32.14%) of inverted papillomas over an age range from 21 to 60 years. There was male predominance and the commonest complaint was unilateral nasal obstruction with epistaxis. Tondon et al quoted 8 cases of inverted papillomas among 64 cases.<sup>(8)</sup> In a study by Thorp et al, inverted papillomas occurred most commonly from the fifth to seventh decade with a male to female ratio of 2:1. The most common presenting symptom was unilateral nasal obstruction.<sup>(9)</sup> In a study by Dasgupta et al, 5 (3.9%) cases of inverted papilloma were reported and commonly seen in males in their third to sixth decade, with mean age of 45 years.<sup>(6)</sup> Most characteristic microscopic features of inverted papilloma were increase in thickness and proliferation of covering epithelium and tumor cells in the form of large nests arising from the epithelial lining and growing downwards into the stroma (Fig. 1).

**Table 1: Types of neoplastic polypoidal lesions**

A)	Benign	No. of cases	Percentage
a)	Pyogenic granuloma	2	7.14%
b)	Capillary haemangioma	3	10.7%
c)	Angiofibroma	12	42.85%
d)	Inverted papilloma	9	32.14%
e)	fibroepithelial polyp	1	3.6%
f)	Nasal papilloma	1	3.6%
	Total	28	
B)	Malignant		
a)	Squamous cells carcinoma	6	42.9%
b)	Low grade adenocarcinoma	2	14.28%
c)	Poorly differentiated carcinoma	5	35.71%
d)	Plasmacytoma	1	7.14%
	Total	14	

**Fig. 1: Low power view of Inverted papilloma, nests of epithelial lining and growing downwards into the stroma (H&E10X)**

**Pyogenic Granuloma:** In the present study, there were 2 cases (7.14%) of pyogenic granuloma in a 20 year old female and in a 50 year old male. The commonest complaint was unilateral nasal obstruction with epistaxis. Jones et al reported a case of pyogenic granuloma in a 37 year old female patient who presented with an enlarging nasal mass.<sup>(10)</sup> Microscopically, the granuloma had flattened stratified epithelium with focal ulceration. The polypoid tissue consisted of numerous closely aggregated small capillary sized blood vessels lined by endothelium. Stroma was loose and edematous with diffuse filtration of lymphocytes. The ulcerated area showed necrotic debris and neutrophils.

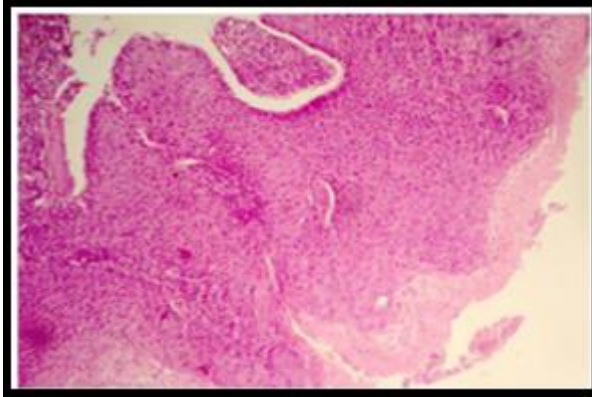
**Nasal Papilloma:** In the present study, a single case of nasal papilloma was reported in a 55 year old male was reported who presented with bilateral nasal block. The polypoidal structure was lined by variably thickened

epithelium from pseudostratified columnar to attenuated epithelium. Stroma was loose, edematous with many blood vessels mixed in inflammatory infiltrate.

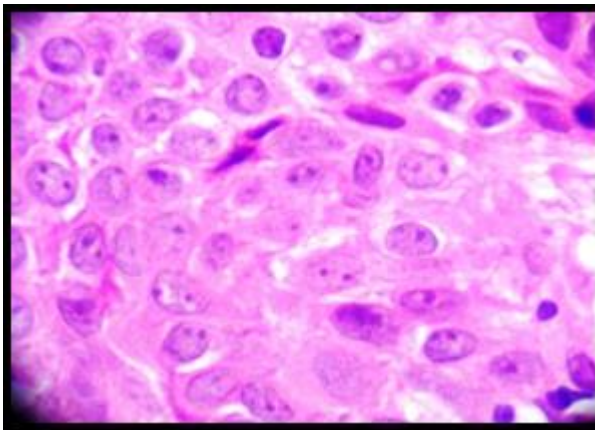
**Fibroepithelial Polyp:** In the present study, there was one (3.6%) case of a fibroepithelial polyp noted in a 31 year old male patient. In a case reported by Peric et al, a fibroepithelial polyp was arising from the inferior turbinate of a 69 year old male. Similar cases were studied by Firat et al who described the lesion as a benign slowly growing tumor presenting as a nasal mass.<sup>(11)</sup> Bakari et al also reported 8 cases of fibroepithelial polyps in their study.<sup>(4)</sup> Microscopically the polypoidal lesion was lined by keratinized squamous epithelium. The stroma showed haphazardly oriented bundles of fibro connective tissue admixed with occasional adipocytes, scattered capillaries, lymphocytes, and sebaceous structures.

**Malignant Polypoidal Lesions:** Primary malignant tumors of nasal cavity, paranasal sinuses and nasopharynx are rare lesions. Willie found only 1.62% of malignant growths in nose and sinuses.<sup>(12)</sup> In the present study, 14 (33%) malignant tumors were encountered, which included five cases each of squamous cell carcinoma (SCC) and poorly differentiated carcinoma, two cases of adenocarcinoma, and one case each of plasmacytoma and spindle cell carcinoma (Table 4). According to Tondon et al, unilateral nasal obstructions with epistaxis were the commonest complaints and the gross appearance was polypoidal.<sup>(8)</sup>

**Squamous Cell Carcinoma:** In the present study, five cases of SCC were reported in males and a single case in a female patient. A majority of the cases presented after the 4th decade as a polypoidal mass causing unilateral nasal obstruction and epistaxis. According to Dasgupta et al, 36.6% (15 cases) of SCC were noted from 41 malignant neoplastic lesions of the nasal cavity.<sup>(6)</sup> In the study by Young R, the commonest tumor of nasal septum was SCC which accounted for more than half of the cases (23 out of 43 cases), among which seven patients presented with a unilateral solitary nasal polyp. The most frequent presenting symptom was nasal obstruction followed by epistaxis.<sup>(13)</sup> In a study by Lathi A et al, malignancy of sinonasal tract was found to be rare, and rather the maxillary sinus was the most common site. In his study, SCC formed 11.6% of all the lesions and 40.6% of neoplastic masses.<sup>(2)</sup> Microscopically, polypoidal bits of tissue were lined by atypical squamous epithelium with features of hyperchromatic nuclei, pleomorphism, abnormal mitosis and loss of polarity. Focally, groups of atypical squamous cells were seen in subepithelial stroma (Fig. 2, 3).



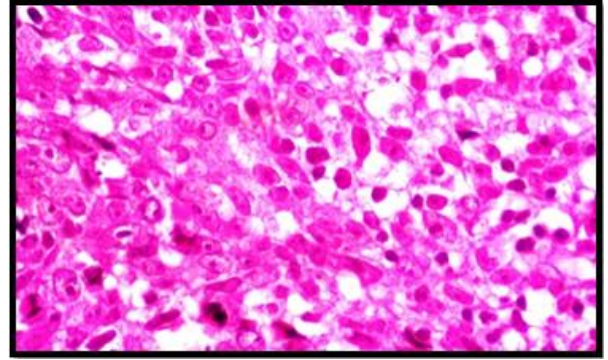
**Fig. 2: Low power view of squamous cell carcinoma showing nuclei with prominent nucleoli (H&E 10X)**



**Fig. 3: High power view of squamous cell carcinoma showing nuclei with prominent nucleoli (H&E 40X)**

Two cases of spindle cell carcinoma of nasopharynx have also been reported by KK Singh, HH. Sharma and DC Sharma.<sup>(14)</sup> Microscopically the tumor contains predominantly necrotic debris infiltrated by neutrophils and mononuclear cells. There were multiple fragments of tumor tissue having densely packed plump spindle nuclei with prominent nucleoli and inconspicuous cytoplasm. Adjacent germinal center and prominent follicles of nasopharynx were noted with overlying epithelium.

**Poorly Differentiated Carcinoma:** In the studies done by El. Naggat et al, cases were seen in both males & females. However in the study of Dasgupta et al, a solitary case was seen in a female. We observed all our five cases in males similar to the studies carried out by Peter Clifford throughout the 1960s and 1970s.<sup>(15)</sup> Microscopically, the polyp resembled an invasive malignant tumor showing diffuse sheets and clusters of neoplastic cells having vesicular nuclei with irregular outline and large prominent nucleoli interspersed with lympho-plasmacytic infiltrate and scattered abnormal mitotic figures (Fig. 4).



**Fig. 4: Low power view of poorly differentiated carcinoma (H&E10X)**

**Adenocarcinoma:** In the present study 2 cases (14.28%), of adenocarcinoma were reported. The presenting complaints were bleeding and mass paranasal sinus. In a study by L Panchal et al 3 cases of adenocarcinoma presented with a mean age of 48.5 years and a male to female ratio of 2:1. The paranasal sinuses and nasal cavity were noted as the most common sites.<sup>(16)</sup> A Lathi et al reported a single case of adenocarcinoma accounting for 7.6% of malignant neoplastic lesions.<sup>(2)</sup> Microscopically tumor cells were arranged in sheets, nests and acinar patterns. The cells were round having moderately pleomorphic nuclei with scant to moderate amounts of cytoplasm and areas of hemorrhage and necrosis.

**Plasmacytoma:** A solitary case of plasmacytoma arising from the maxillary sinus was reported in a 45 year old male patient. A systemic work-up was done including a protein electrophoresis, urine analysis for Bence-Jones proteins, skeletal survey and bone marrow biopsy, which proved that it was a case of extramedullary plasmacytoma. A case reported by G Attanasio et al as a plasma cell neoplasm presented in the 6<sup>th</sup> decade of a female patient and occurred in the sinonasal region.<sup>(17)</sup> Yuan – Yung Lin –also reported this rare entity belonging to the category of non-hodgkin lymphoma in the nasopharynx which presented with nasal obstruction as in our case.<sup>(18)</sup> On microscopy, we observed diffuse sheets of tumor cells showing round nuclei with granular scant to moderate cytoplasm. Some cells depicted prominent nucleoli as well as eccentric nuclei and mitosis 0-1/HPF. Large areas of karyorrhectic debris and areas of necrosis were noted.

**Table 2: Sex incidence polyp and polypoidal lesions**

Study group	Males	Females	Male : Female ratio
Zafar et al <sup>(5)</sup>	79	40	1.9 : 1
Bakari et al <sup>(60)</sup>	34	42	1 : 1.2
Lathi et al <sup>(61)</sup>	68	44	1.5 : 1
Present study	73	27	2.7 : 1

**Table 3: Age incidence of neoplastic polypoidal lesions**

A	Benign	0-10	11-20	21-30	31-40	41-50	51-60	Total	%
a)	Capillary Haemangioma	-	-	3	-	-	-	3	9.09%
b)	Angiofibroma	-	-	4	-	-	-	12	36.36%
c)	Inverted papilloma	-	-	2	-	-	-	9	27.27%
e)	Pyogenic granuloma	-	1	-	-	-	1	2	6.06%
f)	Fibroepithelial polyp	-	-	-	1	-	-	1	3.03%
g)	Nasal papilloma	1	-	-	-	-	-	1	3.03%
<b>Total</b>								28	
<b>B</b>	<b>Malignant</b>								
a)	Squamous cell carcinoma	-	-	-	1	1	3	-	42.9%
b)	Poorly differentiated carcinoma	-	-	-	1	1	3	-	35.71%
c)	Lowgrade adeno carcinoma	-	-	-	1	1	-	2	14.28%
d)	Plasmacytoma	-	1	-	-	-	-	1	7.14%
<b>Total</b>								14	

**Table 4: Comparison among malignant polypoidal lesions in different study groups**

	Tondon et al <sup>(56)</sup> (1982)	Dasgupta et al <sup>(4)</sup> (1997)	Present study (2012)
Squamous cell carcinoma	6	15	6
Poorly differentiated carcinoma	-	1	5
Adeno carcinoma	-	-	2
Plasmacytoma	-	-	1

## Conclusion

Polypoidal lesions can range from simple inflammatory polyps to deadly carcinomas. Hence an accurate histopathological diagnosis is necessary for proper treatment of the patient. The study was helpful in knowing the wide distribution of various polypoidal lesions of nasal cavity, paranasal sinuses and nasopharynx. Although the majority of nasal polyps sent for histology are inflammatory secondary to infection, allergy, or idiopathic causes, a variety of clinical conditions may also present as nasal polyps ranging from benign lesions to malignant nasal tumors. Among the neoplastic lesions, capillary hemangioma was the predominant lesion in benign tumors and squamous cell carcinoma was the most frequently encountered malignant tumor. The occurrence of malignancy, inverted papilloma, capillary hemangioma or other clinically significant pathology in a group of patients where there was no clinical suspicion of untoward pathology was significant. Therefore, a clinician's diagnosis on the basis of history and clinical examination is inadequate; hence all nasal polypoidal masses excised should be submitted for histopathological examination.

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