

Polypoidal Dopplegangers: A Histopathological Spectrum of Lesions in Nasal Cavity, Paranasal Sinuses and Nasopharynx in a Tertiary Care Centre in North Karnataka

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Abstract

Introduction: Nasal cavity, paranasal sinuses and nasopharynx are the sites of origin of some of the complex, histologically diverse group of lesions mostly presenting as polypoidal growths with limited clinical manifestations which causes problem in their diagnosis, prognosis and management.

Aims and Objectives: (1). To study histopathological patterns of various neoplastic and non-neoplastic lesions of nasal cavity, nasal sinus and nasopharynx. (2). To study incidence with age, sex and site distribution of lesions of nasal cavity, paranasal sinus and nasopharynx.

Materials and Methods: This is a prospective study of all the histopathological specimens of lesions of nasal cavity, nasopharynx and paranasal sinuses received in the department of pathology, BIMS Belagavi for a period of 2 years. The specimens were received in 10% formalin and underwent routine histopathological examination. Special stains, immunohistochemistry and fungal culture were done wherever required.

Results: In the present study, a total of 204 cases were analysed. Age distribution ranged from 6 to 81 years with male preponderance. Commonest site being nasal cavity (59%), paranasal sinuses (37%) followed by nasopharynx (4%). Non neoplastic lesions were 182 (89%) and 22 (11%) lesions were neoplastic. Of the non-neoplastic lesions, commonest were inflammatory polyps 45 (25%) followed by 35 cases of allergic polyps (19%). Of the twenty two neoplastic lesions, 11 (50%) cases were of benign and malignant category each. All the cases were carefully re-examined and categorized into Neoplastic and Non-neoplastic lesions on the vast histopathological spectrum of nasal, paranasal and nasopharyngeal lesions. Non-neoplastic lesions were classified according to the classification given by Friedman and Osborn. Tumors of nasal cavity and paranasal sinuses were classified according to WHO classification. Association between site of lesion and type of lesion was found to be significant (P value < 0.05).

Conclusion: There is a wide spectrum of lesions in nasal cavity, paranasal sinuses and nasopharynx with non-neoplastic lesions surpassing neoplastic lesions with great number. Inflammatory and allergic polyps are commonest non neoplastic lesions in this part of the country with tropical savannah climate. Categorizing the lesions into non-neoplastic and neoplastic category based on clinico-radiological, histopathological features and immunohistochemistry helps in diagnosis and patient management. Histopathology still remains the mainstay of definitive diagnosis. Immunohistochemistry has revolutionized the knowledge of surgical pathology by providing tumor subtyping.

Keywords: Nasal Polyps, Histopathological Patterns, Inflammatory Polyp, Neoplastic, Non-Neoplastic.

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Introduction

The nasal cavity and paranasal sinuses occupy the top of the upper respiratory tract and form pneumatic spaces connected with the atmosphere. They are located just beneath the base of the

cranium, where vital structures are harboured. From this region, very much exposed to airborne agents, arise some of the more complex and rare benign and malignant lesions seen in humans.

Difficulties in interpretation of these lesions make this remarkable territory; one of the most challenging in the practice of surgical pathology [12]. Most of these lesions presents as polypoidal growths with limited clinical manifestations which causes problem in their diagnosis, prognosis and management. Histopathological examination helps to assess, diagnose, categorize the lesions into neoplastic and non-neoplastic and ultimately helps in patient management [1,2,3].

Aims and Objectives

1. To study histopathological patterns of various neoplastic and non-neoplastic lesions of nasal cavity, nasal sinus and nasopharynx.
2. To study incidence with age, sex and site distribution of lesions of nasal cavity, paranasal sinus and nasopharynx.

Materials and Methods

All the cases were received from department of ENT, BIMS, Belagavi. Relevant details, clinical and radiological findings were noted for clinico-pathological correlation. All the received specimens were fixed in 10% buffered formalin solution, processed, embedded (thin sections of 4-5 μ m were cut after dewaxing) and then stained with hematoxylin and eosin stains. Special stains like Periodic Acid Schiff Stain and giemsa were done wherever necessary. Fungal culture was advised on histopathologically diagnosed fungal lesions for confirmation. All the cases were carefully re-examined and categorized into Neoplastic and Non-neoplastic lesions. Non-neoplastic lesions were classified according to the classification given by Friedman and Osborn. Tumors of nasal cavity and paranasal sinuses were classified according to WHO classification. Immunohistochemistry was done on all the malignant neoplastic lesions to confirm the tumor subtype. Our observations were compared with other studies.

Statistical Analysis: All the collected data was compiled and subjected to statistical analysis using SPSS software (Statistical package for Social Sciences), version 29. Primary objective of statistical analysis was to determine various parameters mainly incidence and frequency. The data was presented in percentage or proportions and quantitative data in terms of mean and standard deviation. The comparison of mean between the

groups was seen by using appropriate statistical tests. $P < 0.05$ was considered as significant.

Results

This study is a prospective study conducted for a period of 2 years from October 2023 to October 2025 in the Department of pathology, BIMS Belagavi. A total of 204 cases were collected and studied. Out of the total cases 182 cases (89%) were Non-neoplastic and 22 cases (11%) were neoplastic (Table 1).

Table 1 shows the total number of patients included along with The Frequency of distribution of total non-neoplastic and neoplastic lesions of nasal cavity, paranasal sinuses and nasopharynx. Non-neoplastic lesions(89%) were about 8 times to that of neoplastic lesions(11%) in the present study.

Among the 182 cases of non neoplastic lesions, Inflammatory polyp with 45 cases (24.7%) was the most common lesion followed by 35 cases (19.2%) of allergic polyp. 25 cases (14%) of Fungal lesions were diagnosed. There were 10 cases of Rhinosporidiosis, 8 cases of atrophic rhinitis and 5 cases each of Rhinoscleroma and Rhinolith. Inverted polyp was 3 followed by 2 cases of adenoid hyperplasia. There was 1 case (0.5%) of Thornwaldt cyst. (Table 2). Of the Fungal lesions mucormycosis was commonest fungal species followed by aspergillosis. Out of 25 cases 20 cases were correlated with fungal culture results.

Of the 22 neoplastic cases 11 (50%) were benign. Among benign neoplastic lesions commonest were capillary hemangioma and angiofibroma 18% each; ancient schwannoma (4.5%) was the least common among the benign neoplastic lesions.

Squamous cell carcinoma spectrum (63.6%) were the commonest tumors among the malignant lesions presented as multiple subtypes that were confirmed by immunohistochemistry. Squamous cell carcinoma cases showed nuclear positivity for P63. 27.3 % cases were of small round blue cell tumors that showed cytoplasmic positivity for S100.

The non-neoplastic lesions were classified according to the classification given by Friedman and Osborn. Tumors of nasal cavity and paranasal sinuses were classified according the WHO classification. Observations in the present study were compared with other studies.

Table 1: Frequency of distribution of total non-neoplastic and neoplastic lesions of nasal cavity, paranasal sinuses and nasopharynx

Lesion	Number of cases	Percentage
Non-Neoplastic	182	89%
Neoplastic	22	11%
Total	204	

Table 2: Frequency of distribution of types Non neoplastic lesions of nasal cavity, paranasal sinuses and nasopharynx with the histopathological diagnosis

Lesion	Number of cases	Percentage
Inflammatory polyp	45	24.7%
Allergic polyp	35	19.2%
Fungal Infection	25	14%
Acute on chronic inflammatory lesion	20	11%
Acute on chronic non specific adenoiditis	7	3.8%
Chronic non specific inflammation	11	6%
Atrophic rhinitis	8	4.3%
Rhinosporidiosis	10	5.4%
Rhinoscleroma	5	2.7%
Rhinolith	5	2.7%
Inverted polyp	3	2%
Thornwaldt cyst	1	0.5%
Adenoid hyperplasia	2	1%
Necrosis with inflammatory cells	5	2.7%

Table 3: Frequency of distribution of types of Neoplastic lesions of nasal cavity, paranasal sinuses and nasopharynx

Lesion	No. of cases	Percentage (Of total neoplastic)
Capillary Hemangioma	4	18%
Sinonasal papilloma	2	9%
Angiofibroma	4	18%
Ancient schwannoma	1	4.5%
Infiltrating SCC	3	13.6%
Non Keratinising SCC	2	9%
Undifferentiated SCC	1	4.5%
Carcinoma in-situ	1	4.5%
Small round blue cell tumor	3	13.6%
Sinonasal undifferentiated carcinoma	1	4.5%
Total	22/204	100

Table 4 shows the Association between Age and Type of lesion. 4th decade was the most common overall age for both neoplastic and non-neoplastic lesions. Number of males (54.9%) surpassed the number of females (40.1%) and a ratio of 3:2 was obtained. Nasal cavity was the most common site

for both non-neoplastic and neoplastic lesions. Least non-neoplastic lesions were found in nasopharynx while the least neoplastic lesions were seen in paranasal sinuses. P value was found to be significant i.e < .05 in association between site and type of lesion.

Table 4: Association between Age and Type of lesion

Age (in yrs)	Non-neoplastic		Neoplastic		Total	
	No.	%	No.	%	No.	%
0-10	3	1.6	-	-	3	1.4
20-Nov	32	17.5	6	27.2	38	18.6
21-30	28	15.3	3	13.6	31	15.1
31-40	38	20.8	2	9	40	19.6
41-50	27	14.8	3	13.6	30	14.7
51-60	29	15.9	6	27.2	35	17.1
61-70	20	10.9	-	-	20	9.8
71-80	4	2.1	2	9	6	2.9
>80	1	0.5	-	-	1	0.4

Table 5: Association between Sex and Type of lesion

Gender	Non-neoplastic		Neoplastic		Total	
	No.	%	No.	%	No.	%
Male	106	58.2	16	72.7	112	54.9
Female	76	41.7	6	27.2	82	40.1

Male to Female ratio- 3:2

Table 6: Association between Site and Type of lesion

Site of lesion	Non-neoplastic		Neoplastic		Total	
	No.	%	No.	%	No.	%
Nasal cavity	106	58.2	14	63.6	110	53.9
Paranasal sinuses	73	40.1	3	13.6	76	37.2
Nasopharynx	3	1.6	5	22.7	8	3.9

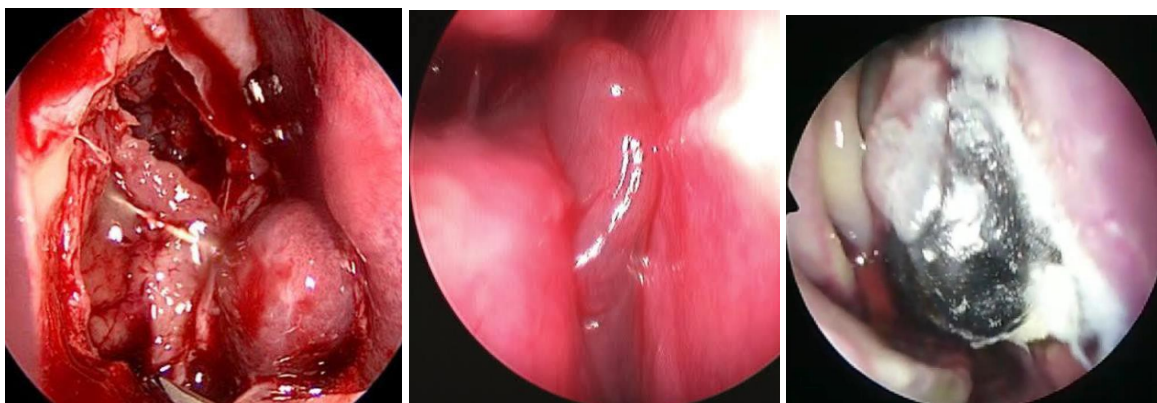


Figure 1: Endoscopic findings showing morphologically different lesions that presented as nasal polyps.



Figure 2- Polypoidal lesions- gross images

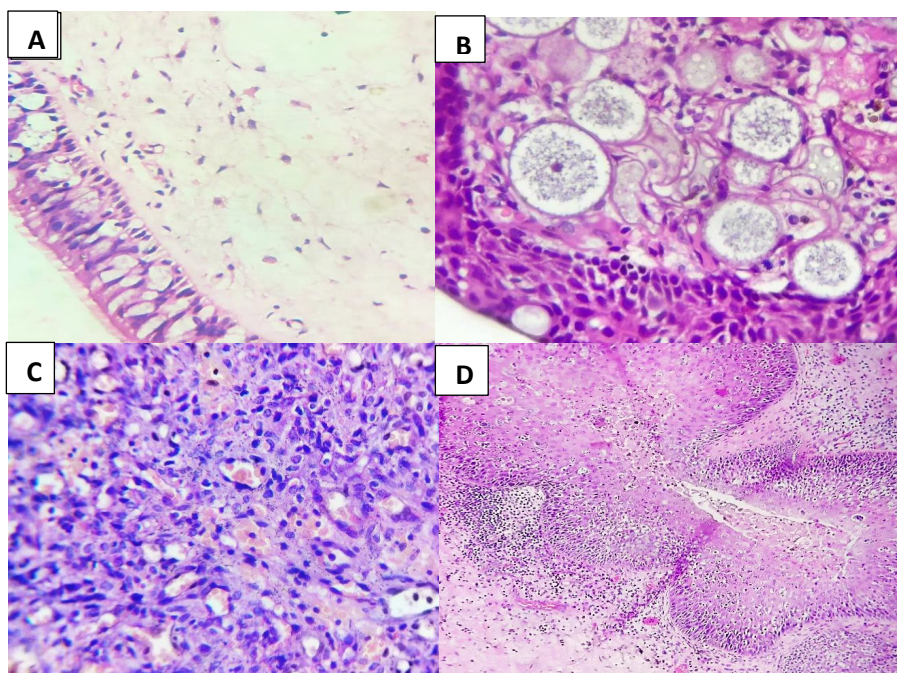


Figure 3: A- Photomicrograph of Inflammatory polyp lined by respiratory epithelium (H&E-40X). B- Photomicrograph of Rhinosporidiosis showing mature sporangia(H&E-40X). C-Photomicrograph of capillary hemangioma(H&E-40X). D-Photomicrograph of sinonasal papilloma. (H&E-40X)

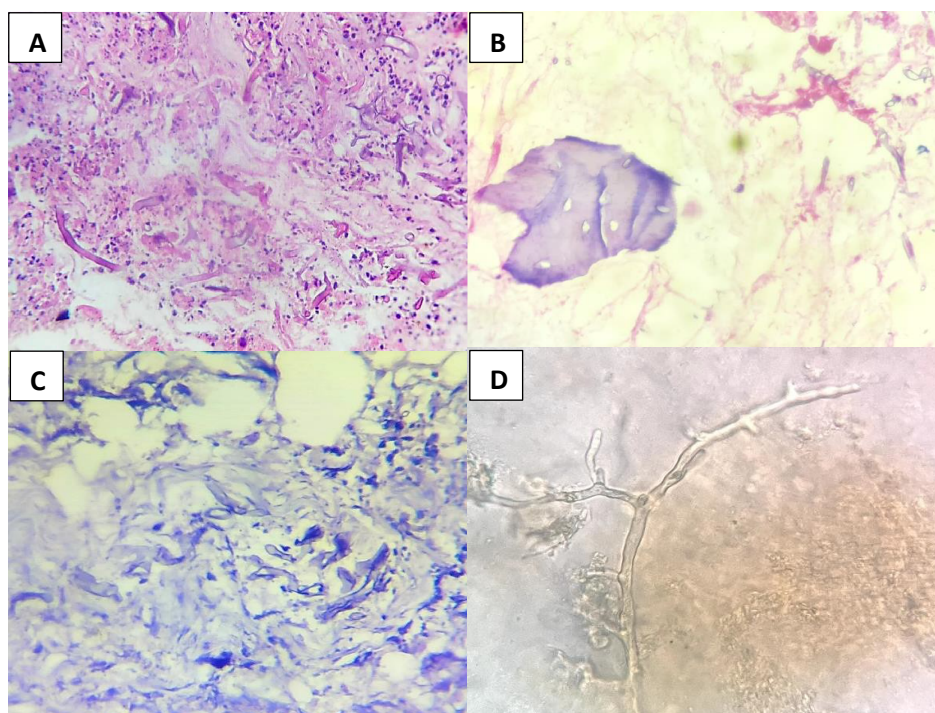


Figure 4: A- Photomicrograph showing broad aseptate hyphae of mucor(H&E40X). B- Photomicrograph showing osteonecrosis with broad aseptate fungal hyphae (H&E40X).C- Photomicrograph showing broad aseptate hyphae of mucor.(PAS-100X). D- Photomicrograph showing broad aseptate hyphae of mucor (Fungal culture)

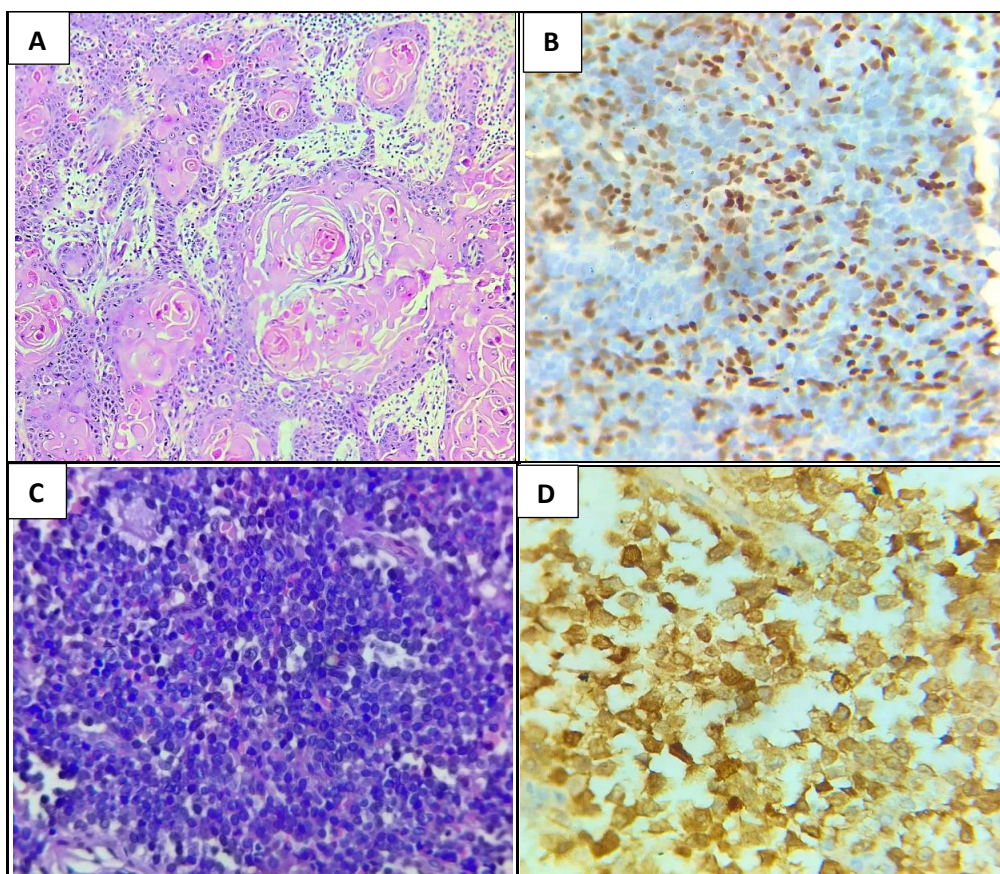


Figure 5: A- Photomicrograph showing Well differentiated squamous cell carcinoma (H & E 40X). B- Photomicrograph showing P63 Positivity in Squamous cell carcinoma (IHC-40X). C-Photomicrograph showing small round blue cell tumor (H & E 40X). D- Photomicrograph showing S100 Positivity in Small round blue cell tumor carcinoma (IHC-100X).

Discussion

This study comprises of 204 cases. 4th decade was the most common age of presentation of sinonasal and nasopharyngeal lesions in our study. In the study done by Muskan et al. 4th and 5th decade were the commonest while according to the study done by Patel S. et al. 6th decade was the most common age of presentation.(Table 7)

Present study showed male to female ratio of 3:2, with male preponderance which was in

concordance with the studies done by Prasad R P et al. However, results obtained by Gedham et al. showed equal male to female ratio. (Table 8)

In current study non-neoplastic lesions were more than neoplastic lesions (18%). These findings were consistent with the findings of Bundela et al. , J P Rajendra et al. and Muskan et al. (Table 9)

Table 7: Comparison of Most common age of presentation with other studies

Study	Patel S. et al.	Dr. Mushkan et al.	Present study
Most common decade	6 th decade	4 th and 5 th decade	4 th decade

Table 8: Comparison of Gender presentation of the lesions with other studies

Prasad R P et al.	Gedham K P et al	Present study
M>F	M=F	M>F

Table 9: Comparison of Non neoplastic lesion percentage with other studies

Study	Bundela et al.	Dr. Mushkan et al.	Present study
% Of Non-neoplastic lesion	85.4%	64%	89%

We observed higher frequency of lesions occurring in the nasal cavity (59%). This is in agreement of studies done by Shah S N et al., Bundela et al.(84.8%) and Prasad R P et al. (67.05%). (Table 10)

Table 10: Comparison of most common site of presentation of lesion with other studies

Study	Bundela et al.	Prasad R P et al.	Present study
Most common site	Nasal Cavity	Nasal Cavity	Nasal Cavity

Table 11: Comparison of most common lesions with other studies (Non-neoplastic and neoplastic)

Study	Prasad R. P. et al.	Singh Ajit et al.	Present study
Most common non-neoplastic	Inflammatory polyp	Inflammatory polyp	Inflammatory polyp
Most common neoplastic benign lesion	Angiofibroma	Hemangioma	Capillary hemangioma and angiofibroma
Most common neoplastic Malignant lesion	SCC	SCC	SCC

Table 12: Comparison of factors showing significant P value (<0.05) with other studies

Study	Singh Ajit et al.	Present study
Type of lesion with site	Not significant	Significant

Of the Non neoplastic lesions the present study showed Inflammatory polyps (24.7%) surpassing other lesions. Studies done by R P Jagannadham et al. (69%), Singh Ajit et al.(75%) and Dr Muskan et al. concluded inflammatory polyp as the most common non neoplastic lesion. (Table 11)

Histologically these inflammatory polyps are lined by pseudostratified ciliated columnar epithelium. Sub epithelium showed loose edematous stroma, mixed inflammatory cells and few seromucinous glands. Allergic polyp also showed similar histology except for dominance of eosinophils in significant numbers.

25 cases in the present study were of fungal infections, mucormycosis being the commonest showing broad, aseptate hyphae on Hematoxylin and Eosin stain which was further confirmed by special stains like Periodic Acid Schiff stain and fungal culture. Second most common fungus was *Aspergillus* showing acute angled, branched septate hyphae.

In our study P value was found significant (<.05) between Type and site of lesion. While in the study done by Singh A et al. the values were not significant. (Table 12)

In the present study Immunohistochemistry was done on neoplastic lesions diagnosed as malignant as per WHO. Malignant lesions were 50% of the neoplastic lesions, squamous cell carcinoma spectrum being the commonest (63.6%) with multiple subtypes showing p63 positivity. Sinonasal undifferentiated carcinoma (9.1%) was p63 negative. Small round blue cell tumor (27.3%) showed S100 positivity.

Conclusion

There is a wide spectrum of lesions in nasal cavity, paranasal sinuses and nasopharynx with non-neoplastic lesions surpassing neoplastic lesions with great number. Inflammatory and allergic polyps are commonest non neoplastic lesions in this part of the country with tropical savannah climate.

Commonest age group is 4th decade with male preponderance. Neoplastic lesions had less incidence than the non-neoplastic. Angiofibroma and capillary hemangioma were the commonest benign neoplastic lesions; Squamous cell carcinoma being the commonest lesion in malignant category.

Most of these lesions present as polyps hence, categorizing the lesions into non-neoplastic and neoplastic category based on histopathological features helps in diagnosis and patient management. Histopathological examination is a cost effective, reliable and simple diagnostic procedure and still remains the mainstay of definitive diagnosis [7,8,9].

Immunohistochemistry has revolutionized the knowledge of surgical pathology by providing tumor subtyping. Radiological, Histopathology and IHC correlation of tumours of nasal cavity, paranasal sinuses and nasopharynx helps to identify the specific subtypes with histopathological overlapping features and hence provides a refined diagnosis. [10]

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