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CLINICOHISTOPATHOLOGICAL PROFILE OF NASAL AND SINONASAL LESIONS: A STUDY FROM CENTRAL INDIA

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Abstract:

Background: Nasal and sinonasal lesions comprise common as well as rarest rare lesions. This region being a site of histopathologically diverse lesions, interests pathologists.

Objectives: The study aimed to find out incidence of nasal and sinonasal lesion with frequency of non-neoplastic, neoplastic lesions, to study spectrum of lesions histopathologically along with correlation of clinical and radiology findings.

Material and methods: It was a 2 year retrospective observational study involving 102 cases from January 2012 to December 2013 carried out at Government medical college, Nagpur.

Study included all specimens received as nasal and sinonasal lesions. Complete clinical history and radiological findings were correlated with histopathology findings.

Results: Nasal and sinonasal lesions are rare having 1.07 % incidence rate. Majority of patients of nonneoplastic and benign neoplastic category belonged to 11-20 age group while malignancies were common in 41-50 age group. We encountered more neoplastic lesions (53.92%) compared to nonneoplastic lesion (46.08%). Male to female ratio was 1.5:1. Sensitivity, specificity and diagnostic accuracy of clinical diagnosis was 94.73%, 97.67 % and 96 % respectively while positive predictive value and negative predictive value was 98.18 % and 93.33 %. p value was 0.317. Discordance in clinic-histopathological diagnosis was in 5.88 %

Conclusion: Though there was good correlation between clinicoradiology findings and histopathology, however in 5.88% discordant cases histopathology diagnosis led to significant alteration of treatment plan proving key role of histopathology diagnosis.

Keywords: Benign, Central India, Clinicohistopathology, Profile, Malignant, Nasal, Sinonasal.

Introduction:

Although the nasal cavity and paranasal sinuses occupy small anatomical space, they are the site of origin of complex, histologically diverse group of tumours of the entire human body.[1] This uniqueness interests pathologists.

Overlapping clinicoradiology features often provides only proviginal diagnosis and Most of lesions either bleeds or are inaccessible for fine needle aspiration [2, 3]

Studying clinicohistopathology is crucial as possibility of changing a benign lesion in to malignancy could be identified. [4]

Also frequency of non-neoplastic and neoplastic nasal and sinonasal lesions varies from region to region.[5]

Aims and objectives:

1. To study frequency of lesions in nasal cavity (NC) & paranasal sinuses (PNS) along with frequency of non-neoplastic, benign & malignant neoplastic lesions.

2. To study histopathology of various lesions occurring in nasal cavity & paranasal sinuses.

3. To study the clinicohistopathological correlation of nasal cavity & paranasal sinuses lesions.

Material and Methods: The Retrospective observational study involving 102 patients was conducted from September 2011 to august 2013 at department of pathology of Government medical college, Nagpur which is a advanced tertiary care government institute of central india. Biopsy or excisional specimens of those patients having nasal and sinonasal masses were included in the study. Lesions of nasopharynx were excluded from the study. Detail history was taken for symptoms, clinical examination and radiology findings. Clinical diagnosis was recorded.

For histopathological processing, special stains and ancillary technique(IHC) of specimen whenever required guidelines by Bancroffts book of histopathology techniques were followed.[6]

The diagnosis of sinonasal lesions was made on the basis of clinical presentation, gross morphology and light microscopic features of H&E and special stained sections

The lesions were classified as non -neoplastic, benign neoplastic and malignant neoplastic lesions. The lesions were classified according to Ackerman 10thedition and WHO classification (2005).[7,8]

Statistical descriptive analysis was done for calculating age ,sex & site composition of the cases, frequency distribution of presenting symptoms, signs, outcome of histopathology diagnoses. Unpaired t test and McNemar Chi^2 test was used to analyse data.

Results:

The present study included 102 sinonasal lesions. Various factors regarding clinical presentation, findings of radiology investigations and histopathology characteristics were analyzed. During 2 year study period we received 9469 total surgical specimens from all the Departments in the institute of which 102 sinonasal lesions were reported, representing frequency of 1.07%.

In the present study, youngest patient was 1 year old and oldest was 75 years old, with mean age of 32.80 years and 18.27 SD.

It was observed from Table no I that neoplastic lesions 55(53.92%) were common than nonneoplastic lesions 47(46.08%) in the nasal cavity and paranasal sinuses. Malignant neoplastic lesions were more in number than the benign neoplastic lesions in our study.

Maximum number of patients belonged to the age group of 11-20 years. Maximum cases of non-neoplastic category belonged to the age group of 11-20 years, mean 28.04 years +/- 16.12 SD. Benign neoplastic lesions had maximum no of cases in 11-20 years, mean 27.96 +/- 17.10 SD. Maximum no of cases of malignant neoplastic category belonged to the age group of 41-50 years, mean 43.9 +/- 18.25 SD.

From table no II it was observed that out of 102 patients 60.78% were males there was male preponderance in all diagnostic categories specially benign neoplastic category. Male to female ratio was found to be 1.5 : 1. In malignant neoplastic categories sex ratio was equal. Nasal cavity was common site of involvement in all diagnostic categories except malignant neoplastic category 23/30 (76.67%) where PNS was common site of involvement .

It was observed that there was equal right 37(36.27%) and left side 38(37.25%) involvement by nasal and paranasal lesions. Bilateral involvement was seen in 27(26.47%)

Table no III indicates overall most common symptoms in nasal and sinonasal lesions were nasal obstruction 97 (95.10%) followed by polypoidal nasal mass 64 (62.75%) and nasal discharge 60 (58.82%). In benign neoplastic cases epistaxis12/24(50%) was also commonly seen in addition to above symptoms. In malignant neoplastic cases nasal obstruction 28/30 (93.33%), facial swelling 20/30 (66.67%) and epistaxis 10/30 (33.33%) and proptosis 3/30 (10) were common symptoms.

Maximum number of patients presented with symptoms within 3-6 months duration. Majority of cases presenting < 3 month period were of malignant neoplastic category. Among 102 patients radiological investigations mostly x ray and CT Scan were available in 87 patients. MRI was done in single case of nasal glioma to see for intracranial communication. Radiological investigations were not done in 15 patients.

Table no IV indicates that there was 100% correlation in non neoplastic and malignant neoplastic categories while in benign neoplastic it was 90%. Two cases which were diagnosed as fibrous dysplasia and benign neoplasm turned out to be low grade osteosarcoma and rhinoentomophthoromycosis on histology. Overall there was good radiohistological correlation 97.70%. However, in most cases, radiology was inadequate to predict the histological subtype.

Table no V shows that in nonneoplastic lesions (n=47), nonallergic polyp was the commonest lesion accounting for 33/47 cases (70.21%). Figure no 1 shows a rare lesion rhinoentomophthoromycosis. It was confirmed by growth on sabourods media. In neoplastic benign lesions (n=24) nasal angiofibroma was the commonest 12/24 cases (50%). In neoplastic borderline lesions we found a single case of hemangiopericytoma. In malignancies squamous cell carcinoma was commonest 12/30(40%) including variants like keratinizing, nonkeratinising and basisquamous followed by olfactory neuroblastoma 4/30(13.33%) and adenoid cystic carcinoma 3/30(10%) and chondrosarcoma 2/30(6.67%). In case of olfactory neuroblastoma immunohistochemistry markers CD 56, synaptophysin and EMA were positive.

As per table No VI complete clinicopathological correlation was seen in 96/102 cases (94.12%) Diagnostic discordance was noted in 6/102 cases (5.88%). Out of 6 discordant cases 3 cases clinically suspected of sinonasal polyp, on histology revealed SCC associated with inverted papilloma, sinonasal adenocarcinoma and hemangiopericytoma respectively. A case labeled as benign neoplasm clinically, showed features of rhinoentomophthoromycosis on histology. In case suspicious of fibrous dysplasia, histopathological diagnosis was low grade osteosarcoma. Also in case of atrophic rhinitis, histopathology was strongly positive for lepromatous leprosy.

Here out of 6 discordant cases 2 were excluded from analysis as those were misdiagnosed with in same categories. Sensitivity and specificity of clinical diagnosis for diagnosing neoplastic & non-neoplastic lesions of NC & PNS was calculated from remaining 100 cases

Mc Nemar Chi^2 = 1 and p = 0.3175

In the present study, sensitivity, specificity and diagnostic accuracy of clinical diagnosis for diagnosing neoplastic & non-neoplastic lesions of nasal cavity and paranasal sinuses was 94.73%, 97.67 % and 96 % respectively while positive predictive value and negative predictive value was 98.18 % and 93.33 %. Here though p value was 0.3175 which was insignificant suggesting good correlation between clinical and histopathological diagnosis, in 5.88 % discordant cases histopathological diagnosis led to significant alteration in treatment management.

Discussion: Studying nasal and sinonasal lesions is important as these are anatomically close to organ of special senses , central nervous system and embriologically distinct from nasopharynx as ectodermally derived inspite of having similar epithelial lining. [8]

The frequency of nasal and sinonasal lesions in present study was 1.07% comparable to 1.59% in study by Kulkarni et al[9] while Jyothi et al[10] found low frequency of 0.47%.

In the present study, age of the patients presenting with nasal and sinonasal lesions ranged from 1 year to 75 years with mean age of 32.80 years. Largest age group affected being 11-20 years (33.33%). The next largest group was in the age range of 41-50 years (16.66%).

Similar age incidence was noted by Bakari et al[11]with mean age 33.3 years and 39.4 years in Bist et al[12] study , who found largest age group in second decade & mean age 39.4.

Lathi et al[13] age incidence was also similar with present study. But Kulkarni et al[9] found lower mean age of 22.5.

Our results of male : female ratio of cases of nasal and sinonasal lesions correlated well with studies done by Jyothi et al[10] and Lathi et al.[13] Kulkarni et al[9] & Bist et al[12] also found male preponderance while Bakari et al[11] found female preponderance of 1:1.2. Out of 102 cases in the present study, 60.78% were males and 39.42% were females. There was male preponderance in all diagnostic categories specially benign neoplastic category. In malignant neoplastic categories sex ratio was equal.

In present study nasal cavity was common site of involvement by nasal and sinonasal lesions 73/102 (71.57%) and paranasal sinus involvement was seen in 29/102 (28.43%). Paranasal sinuses were common site of involvement in malignant neoplastic category 23/30 (76.67%).

Kulkarni et al 2012[9] found nasal cavity involvement in 89.74 % while paranasal sinuses were involved in 10.26%.

Zafar et al 2008[14] in study of nonneoplastic lesions of nasal and sinonasal region found 74.408% nasal cavity and 25.51% paranasal sinus involvement.

Ashokkumar et al [2] in study of benign sinonasal tumor found 88% nasal cavity and 12% paranasal sinus involvement. Site distribution findings of present study correlated well with above mentioned studies.

In present study there was equal involvement of right (36.27%) and left (37.25%) side and bilateral involvement was seen in 26.47%, while study by Bist et al 2012[12] had slight left (37.27%) sided more involvement over right (29.09%) side by nasal and sinonasal lesions.

In present study most common symptom in nasal and sinonasal lesions were nasal obstruction 97/102 (95.10%) followed by polypidal nasal mass 64/102 (62.75%) and nasal discharge 60/102 (58.82%) which correlated well with studies by jyothi et al,[10] bakari et al,[11] bist et al,[12]and lathi et al.[13]

In present study symptoms like nasal obstruction, polypoidal nasal mass, nasal discharge, epistaxis and facial swelling overlapped in all the categories of lesion. In benign neoplastic cases nasal obstruction 22/24(91.67%), epistaxis12/24(50%) and polypoidal nasal mass 10/24(41.67%) were common symptoms.

In malignant neoplastic cases nasal obstruction 28(93.33%), facial swelling 20(66.67%) and epistaxis 10(33.33%) and proptosis 3(10%) were common symptoms.

In accordance with our study, another study by Iqbal et al [15] also reported large number of patients with malignancies having cheek swellings (15.68%) followed by external nasal deformity (11.76%) and proptosis (5.88).

There was a predominance of malignant neoplastic lesion in our study when compared with other studies like kulkarni et al [9] and jyothi et al.[10] But study by Bist et al[12] also showed predominance of malignant lesions. This finding in present study could be due to more number of patients with complicated and higher stage lesions referred for management to tertiary care center with chemotherapy and radiotherapy facilities like present study institution.

In present study among the non-neoplastic lesions nonallergic polyps were the commonest lesion seen in 70.21% patients, this correlated with findings of Jyothi et al[10 and] Bakari et al[11]

Among the benign lesions, angiofibroma was the commonest one diagnosed in 50% patients. Among the

malignant lesions, squamous cell carcinoma was the commonest lesion seen in 40 % patients. Our results were in accordance with other studies by Jyothi et al[10], Bist et al[12] and Seema et al[16]

Different authors found different range of non-neoplastic lesions like some authors found allergic polyp as most common, in some studies rhinosporidiosis is common finding. In benign neoplastic lesions there were varied findings by different authorst like kulkarni et al,[9] lathi et al, [13] dasgupta et al[17] and s. g. singh et al [18]found hemangioma as most common lesion while inverted papilloma was common in studies of bakari et al[11] and ashkkumar et al.[l2]

In present study clinicopathological discordance was 5.88%, this correlated well with study by Chopra et al[19] (6%) and slightly higher compared to study by Bist et al[12]in which 3.63% lesions showed difference in clinicopathological diagnosis.

In present study there was good radiological correlation 85/87(97.70%). About 2 discordant cases, most probably due to the fact that there was no evidence of bone erosion or extra sinus mucosa involvement in these cases and varied clinical presentation.

A Study by Bist et all 2012[12] showed 100% radiological correlation and 96.37% clinicopathological correlation.

Table I: Age distribution & its correlation with diagnostic categories

Sr No	Age group (Years)	Total No of cases (%)	Non-neoplastic Cases (%)	Benign Neoplastic Cases (%)	Borderline Neoplastic cases (%)	Malignant Neoplastic cases (%)
1	1 -10	6 (5.88)	3 (6.38)	1 (4.17)	-	2 (6.67)
2	11-20	34 (33.33)	21 (44.69)	11 (45.83)	-	2 (6.67)
3	21-30	13 (12.75)	6 (12.76)	4 (16.67)	-	3 (10)
4	31-40	16 (15.69)	9 (19.15)	2 (8.33)	1 (100)	4 (13.33)
5	41-50	17 (16.66)	3 (6.39)	3 (12.50)	-	11 (36.66)
6	51-60	6 (5.88)	2 (4.25)	2 (8.33)	-	2 (6.67)
7	61-70	7 (6.86)	2 (4.25)	1 (4.17)	-	4 (13.33)
8	71-80	3 (2.94)	1 (2.13)	-	-	2 (6.67)
Total		102	47	24	1	30

Table II: Sex and site distribution of NC & PNS lesions & its correlation with diagnostic categories

Sr No	Sex & site	Total no. of cases (%)	Non- neoplastic cases (%)	Benign neoplastic cases (%)	Borderline neoplastic cases (%)	Malignant neoplastic cases (%)
1	Male	62 (60.78)	27 (57.45)	20 (83.33)	1 (100)	14 (46.67)
2	Female	40 (39.22)	20 (42.55)	4 (16.67)		16 (53.33)
3	NC*	73(71.57)	43(91.49)	22(91.67)	1(100)	7(30.43)
4	PNS**	29(28.43)	4(8.51)	2(8.3)	0	23(76.67)
Total	102	47	24	1	30	102

(*NC – Nasal cavity, **PNS – Paranasal sinus)

Table III: Symptomatology in NC & PNS lesions in present study

Sr. No.	symptom	Total no of cases (%)	Non neoplastic cases (%)	Neoplastic Benign cases (%)	Neoplastic Borderline cases (%)	Neoplastic Malignant cases (%)
1	Nasal obstruction	97(95.10)	46(97.87)	21(87.50)	1(100)	28(93.33)
2	Polypoidal mass	64 (62.75)	42(89.36)	10(41.67)	1(100)	11(36.67)
3	Nasal discharge	60 (58.82)	41(87.23)	16(67.67)	-	4(13.33)
4	Headache	17 (16.66)	0	3(12.50)	-	11(36.67)
5	Sneezing	7 (6.86)	7(14.89)	0	-	0
6	Anosmia	22 (21.57)	10(21.27)	12(50)	-	0
7	Facial swelling	24 (23.53)	0	2(8.30)	-	20(66.67)
8	Epistaxis	23(22.55)	2(4.25)	12(50)	-	10(33.33)
9	Protrusion of eye	3(2.94)	0	0	-	3(10)
10	Change in voice	3(2.94)	0	3(12.5)	-	0
11	Facial pain	4(3.92)	0	1(4.17)	-	3(10)
Total	102	47	24	1	30	Total

Table IV: CT SCAN impressions in present study

Category	Non-neoplastic	Benign neoplastic	Malignant neoplastic	Total
No. Of Patients (CT SCAN Impression.)	39	20	28	87
Histology correlation (%)	**39(100)**	**18(90)**	**28(100)**	**85(97.70)**

Table V: Distribution of cases according to histopathology type of lesion

Diagnosis	No of cases	Percentage
	Nonneoplastic(47)	
Non allergic polyp	33	
Allergic polyp	8	
Rhinoscleroma	2	
Rhinosporidiosis	1	
Nasal glioma	1	
Lepromatous leprosy	1	
Rhinoentomophthoromycosis	1	
	Neoplastic(55)	
Benign	**24**	
Nasal angiofibroma	12	
Hemangioma	6	
Inverted papilloma	4	
Ossifying fibroma	1	
Osteoid osteoma	1	
Borderline	**1**	
Hemangiopericytoma	1	
Malignant	**30**	
Squamous cell carcinoma	12	
Olfactory neuroblastoma	4	
Adenoid cystic carcinoma	3	
Chondrosarcoma	2	
Sinonasal undifferentiated carcinoma	1	
Adenocarcinoma	1	
Polymorphous low grade adenocarcinoma	1	
Epithelial myoepithelial carcinoma	1	
Osteosarcoma	1	
Fibrosarcoma	1	
Rhabdomyosarcoma	1	
Malignant melanoma	1	
Plasmacytoma	1	
Total	102	100

Table VI: Clinico-histopathological correlation in the study

Sr. No.	Clinical diagnosis	No. of cases	Consistant	Inconsistant	Concordance (%)
1	Non-neoplastic	49	45	4	91.83%
2	Benign neoplastic	26	24	2	92.30%
3	Malignant Neoplastic	27	27	0	100%
Total		**102**	**96**	**6**	**94.12%**

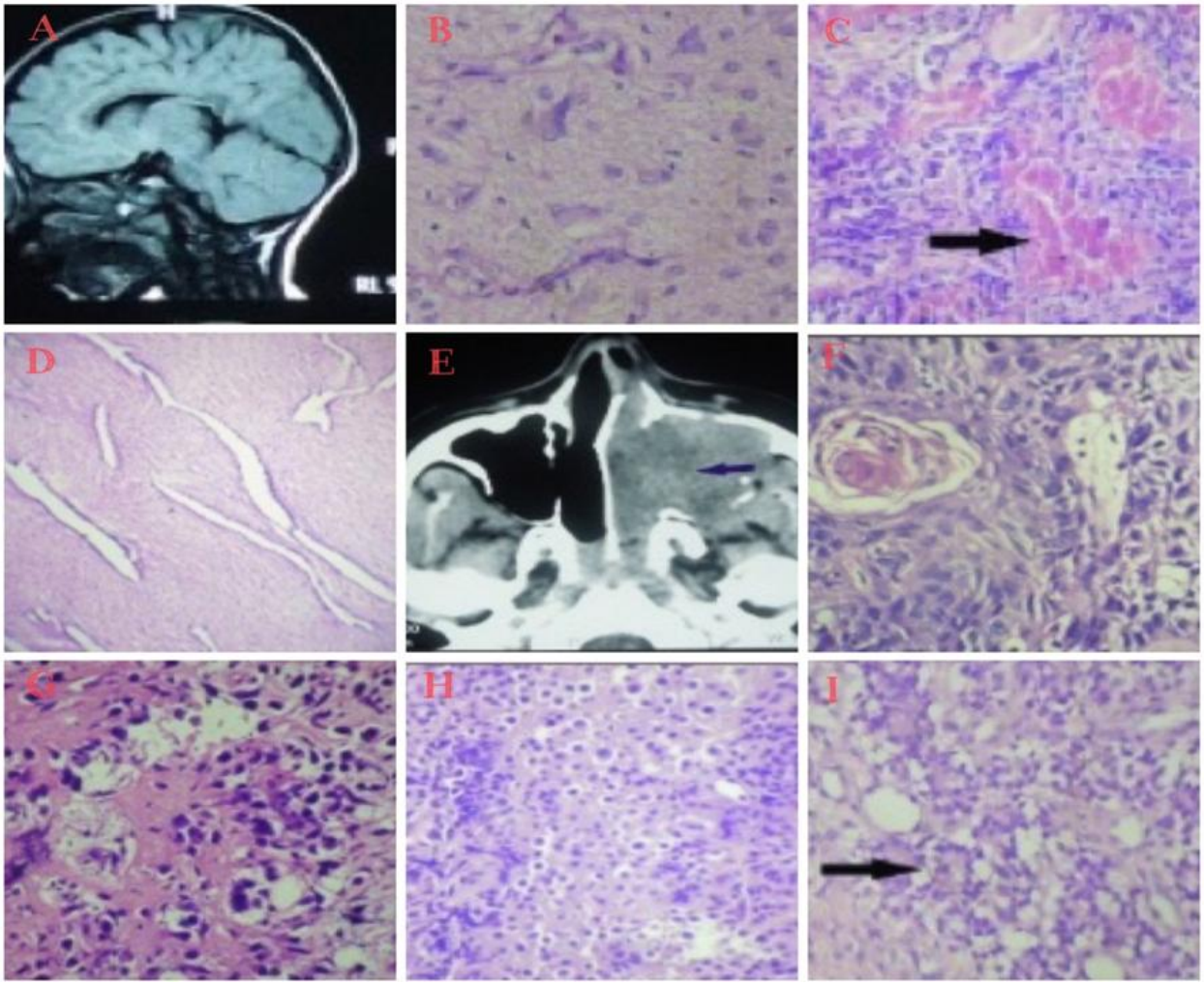

Figure 1: shows histopathological spectrum seen in present study.
A: Nasal glioma MRI brain showing no intracranial extension.
B: Nasal glioma , H & E 400 X
C: Rhinoentemophthoromycosis, H & E, 400 X
D: Nasal angiofibroma. H & E, 400 x
E: CT PNS showing soft tissue mass destroying left maxillary sinus wall
F: Keratinising Squamous cell carcinoma H & E, 400 X
G: Osteosarcoma, H & E, 400 X
H: plasmacytoma, H & E, 400 X
I: Neuroblastoma H & E, 400 X

Conclusion:

Though lesions of nasal and paranasal sinuses have very low frequency, wide range of histologicaly complex and diverse lesions are seen here.

Frequency and distribution of nasal and sinonasal lesions varies from region to region.

The presenting features of all sinonasal lesions may be indistinguishable and therefore represent diagnostic and therapeutic dilemma. The similarities of non-neoplastic and neoplastic lesions at initial presentation may lead to a significant delay in the diagnosis.

Although rare unexpected clinically suspected diagnosis can be found on histopathological examination. The occurrence of malignancy or other clinically significant pathology which altered treatment management among the group of patients with otherwise clinically unsuspected histology justifies sending nasal and sinonasal lesions for routine pathologic examination.

Correlation of clinical, radiologic and pathologic modalities is of utmost important for accurate diagnosis. All these modalities are complementary to each other.

The presenting features, symptomatology and advanced imaging technique help to reach a presumptive diagnosis

but histopathological examination remains the mainstay of definitive diagnosis.

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