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HISTOPATHOLOGICAL SPECTRUM OF SINONASAL LESIONS: A STUDY FROM TERTIARY CARE HOSPITAL OF INDIA

Pathology

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ABSTRACT

Introduction: Sinonasal lesions are frequently observed in the Otorhinolaryngology practice. Majority present as polypoidal lesions with nasal obstruction complicating the diagnosis for the physician which in turn hampers the patient prognosis and in few cases survival of patient, so histopathology is imperative to arrive at the diagnosis. **Aims & Objectives:** To study the histopathological spectrum of sinonasal lesions and to categorize various lesions into non-neoplastic and neoplastic lesions along with incidence, age and sex distribution with their clinical presentation. **Materials and Methods:** This 2 years retrospective study was carried out at the Department of Pathology in a tertiary care hospital. Demographic details including age, sex and clinical presentation were obtained from histopathology records. **Result:** A total of 150 samples of sinonasal tissue sent for histopathology were studied, out of which 140 were non neoplastic (93.33%) and 10 were neoplastic (7.67%) lesions. Male preponderance was observed. Mucormycosis was the most common non neoplastic lesion accounting for a total 109 cases (72.66%). Nasopharyngeal angiofibroma (1.33%) was the most common benign lesion and sinonasal undifferentiated carcinoma (1.33%) was the most common malignant lesion encountered. **Conclusion:** This study elaborates wide spectrum of sinonasal lesions. Non neoplastic lesions are encountered more as compared to neoplastic lesions. Histopathological examination is essential for the diagnosis of these lesions as clinical and radiological features may be overlapping. This study is primarily focused on the evaluation of these lesions and the corresponding clinical features. This would enable us to provide the clinician with necessary details and diagnosis so that proper treatment may be administered to the patient, so as to avoid recurrence and increase the patient's quality of life.

KEYWORDS

Sinonasal lesions, mucormycosis, sinonasal undifferentiated carcinoma

INTRODUCTION

Lesions in the sinonasal cavity and nasopharynx have inflicted man from time immemorial. A variety of non-neoplastic and neoplastic conditions involve the sinonasal cavity and these are very common lesions encountered in clinical practice. In neoplastic lesion it may be benign or malignant. These lesions produce a wide range of features ranging from epistaxis, respiratory obstruction to destruction of local structures. Inflammation of local tissue produced by these lesions may bring changes in local anatomy and physiology. The presentation of all masses either benign or malignant is almost similar and hence a thorough clinical examination becomes necessary for provisional diagnosis. However it is a careful histopathological examination which decides the nature of any particular lesion and also makes possible to implement correct and timely interventions, which is a major deciding factor for better prognosis.

AIMS AND OBJECTIVES:

To study the histopathological spectrum of lesions of nose and paranasal sinuses and to categorize the various lesions of nose and paranasal sinuses into non-neoplastic and neoplastic lesions and to study the incidence of lesions with respect to age, sex and site.

MATERIALS AND METHODS:

This was a retrospective study carried out over a period of 2 years in a tertiary care institute. All specimens of nasal and paranasal sinus lesions received in 2 years were included in this study. A total of 150 cases of sinonasal lesions were evaluated in Pathology department of Grant Government Medical College and Sir JJ Group of Hospital, Mumbai, Maharashtra. Patient clinical history was obtained from the patient's case file and institution's histopathological requisition forms. All specimens were received in a well labeled and sealed jar containing 10% buffered formalin. Gross examination of specimens received in pathology department was done. After gross examination, tissue was processed routinely followed by paraffin embedding. Tissue sections of 3-4 microns thickness were cut on microtome and studied in detail by staining with Haematoxylin and Eosin stains. Special stains were used wherever necessary.

RESULTS AND OBSERVATIONS

Total number of nasal and paranasal sinuses specimens received were 150 (1.88%.). Nasal and paranasal sinuses lesions were analyzed and the histopathological features were reported as non-neoplastic and neoplastic. Out of 150 specimens, 140(93.33%) were non-neoplastic and 10 (6.6%) were reported as neoplastic lesions.

Table 1: Lesion Wise Categorical Distribution

Lesion		Number of cases	Percentage
Non-neoplastic	Infective	120	80%
	Inflammatory	19	12.67
	Allergic	01	00.67%
Neoplastic	Benign	06	4 %
	Malignant	4	2.66 %
Total		150	100%

In present study, infective lesions were the most common lesions accounting for 120 (71.84%) cases in non-neoplastic lesions. The percentage of benign neoplasms out of 150 cases were 6 cases (1.5 %) and malignant neoplasms were 4 (2.66 %).

Table 2: Age Wise Distribution Of Nasal And Paranasal Sinuses Lesions

Age wise	Non neoplastic	Benign	Malignant	Number of cases	Percentage
0-10 years	00	00	00	00	0%
11-20 years	01	01	00	02	1.33%
21-30 years	09	01	00	10	6.67%
31-40 years	18	03	00	21	14%
41-50 years	34	01	01	36	24%
51-60 years	41	00	01	42	28%
61-70 years	30	00	01	31	20.67%
71-80 years	0	00	01	08	5.33%
Total	140	06	04	150	100%

In present study, as mentioned in above Table out of 150 cases, majority of cases belonged to 51-60 years age group (28%) followed

by 41-50 years age group (24%) and least common age group affected was 11-20 years with (1.33%).

Table 3: Sex Wise Distribution Of Nasal And Paranasal Sinuses Lesions

Lesion		Male	Female
Non-neoplastic		87	53
Neoplastic		07	03
Total	150	94	56
Percentage	100%	68.66%	31.33%

In our study, nasal and paranasal lesions were more common in males accounting for 94 (68.66%) cases.

Table 4: Distribution Of Histopathological Feature Of Nasal And Paranasal Sinuses

Histopathology Findings	Number of cases	Percentage
Mucormycosis	109	72.66%
Inflammatory Nasal Polyp	19	12.66%
Allergic nasal polyp	01	0.67%
Aspergillosis	06	4%
Candidiasis	04	2.66%
Inverted Papilloma	01	0.67%
Neurofibroma	01	0.67%
Angiofibroma	02	1.33%
Capillary hemangioma	01	0.67%
Chondromesenchymal hamartoma	01	0.67%
Conidiobolomycosis	01	0.67%
Squamous cell Carcinoma	01	0.67%
Sinonasal Undifferentiated carcinoma	02	1.33%
Mucosal melanoma	01	0.67%
Total	150	100%

The most common non-neoplastic lesion was fungal infection (Mucormycosis) with 109 (72.66%) cases followed by inflammatory nasal polyp with 19 (12.66%) cases.

In benign neoplasms, the most common benign neoplasm was nasopharyngeal angiofibroma with 2 (1.33%) cases.

In malignant neoplasms, the most common malignant neoplasm was Undifferentiated sinonasal carcinoma with 2 (1.33%) cases. 1 case (0.67%) of squamous cell carcinoma and 1 case (0.67%) of mucosal melanoma was noted.

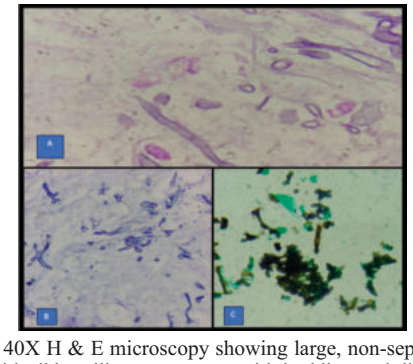

Fig 1. A. 40X H & E microscopy showing large, non-septate fungal hyphae with ribbon like appearance, with budding and dichotomous branching B. 40X PAS stain showing fungal hyphae of mucormycosis C. 40X GMS stain showing fungal hyphae of mucormycosis

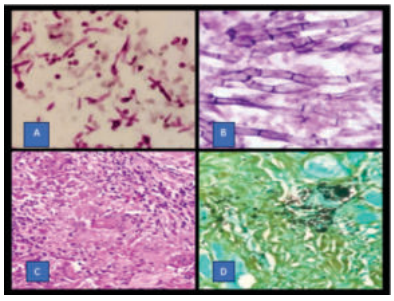

Fig.2. A. 100X H & E microscopy showing pseudohyphae and budding yeast forms of Candida B. Aspergillus :100X PAS stain microscopy showing septate hyphae branching at 45° with dichotomous branching C. Conidiobolomycosis (40X H & E) microscopy showing Splendore Hoeppli phenomenon D. Conidiobolomycosis: (40X GMS stain) showing spores of Conidiobolomycosis

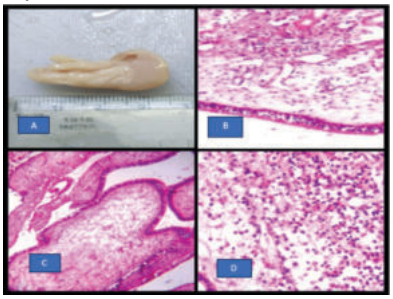

Fig.3 A. Inflammatory Polyp: Gross appearance of inflammatory nasal polyp – white, glistening, polypoidal B. Inflammatory Polyp 100X H & E microscopy shows subepithelial mixed inflammatory infiltrate comprising of neutrophils C. Allergic Polyp 40X H & E microscopy showing pseudostratified columnar ciliated lining. Underlying oedematous submucosa showing inflammatory infiltrate D. 100X H & E microscopy shows mixed inflammatory infiltrate comprising of predominantly

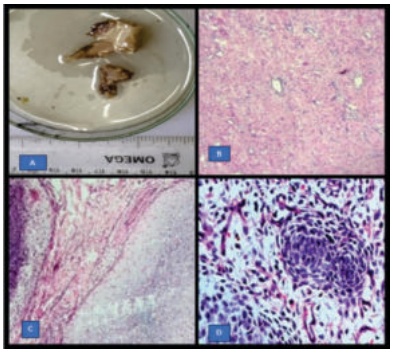

Fig.4 A. Nasopharyngeal angiofibroma- Gross appearance- greyish white mass B. Nasopharyngeal Angiofibroma 40X H&E microscopy showing fibrocellular stroma with spindle cells and haphazardly arranged collagen. The blood vessels showing typical staghorn type appearance. C. Sinonasal hamartoma - H&E 40X microscopy - Chondroid component D. Sinonasal hamartoma H&E 40X microscopy - Mesenchymal component

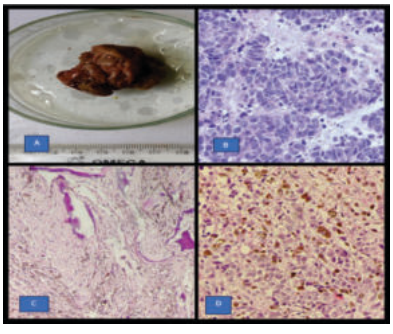

Fig.5 A. Undifferentitated Sinonasal Carcinoma Gross: Greyish brown mass B. Sinonasal Undifferentitated carcinoma (100X H & E) C. Mucosal melanoma (100X H & E) Tumor arranged in diffuse sheets, nests with focal areas of necrosis and tumour is seen invading the bone D. Individual tumour cells are large and intracytoplasmic coarse brown pigment is seen. The nuclei are large with coarse chromatin and prominent macronucleoli.

DISCUSSION:

Table 5: Comparison between distribution of lesions of nose and paranasal sinuses in present study and other studies

Authors	Non neoplastic lesions %	Neoplastic lesions %
Lathi A. et al. (2012) n=112	71.4	28.6
Garg D. et al. (2014) n= 91	73.6	26.4

Ghanghurde S. et al. (2017) n=50	72	28
Present study n=150	93.33	6.67

In the present study we found 93.33% of the sinonasal lesions to be non-neoplastic and 6.67% to be neoplastic.

Lathi A. et al (2011) studied clinicopathological profile of sinonasal masses at Rural tertiary care hospital, found 71.4% lesions as non-neoplastic and 28.6% lesions as neoplastic. Garg D. et al(2014) , Ghanghurde S. et al. (2017), observed non-neoplastic sinonasal lesions in 73.6% and 72% cases respectively while neoplastic lesions in 26.4% and 28% cases respectively.

In the studies done by Lathi A. et al (2011), Garg D. et al (2014), Ghanghurde S. et al. (2017) there is predominance of non-neoplastic lesions over neoplastic lesions.

Our findings are in accordance with them and incidence of non-neoplastic lesions is much more than neoplastic lesions than these studies.

Table 6: Comparison of age distribution pattern in lesions in nasal cavity and paranasal sinuses in present study and other studies

Age in years	Lathi A. et al (2011) n=112	Nayak M et al (2015) n= 134	Present study n = 150
0-10 years	11(9.8%)	2(1.49%)	0(00%)
11-20 years	24(21.5%)	17(12.68%)	2(1.33%)
21-30 years	22(19.6%)	30(23.28%)	10(6.67%)
31-40years	23(20.5%)	37(27.61%)	21(14%)
41-50years	15(13.4%)	15(.11.19%)	86(24%)
51-60years	6(5.4%)	16(11.94%)	42(28%)
61-70years	1(9.8%)	12(8.95%)	31(20.67)
71-80years	_	5(3.73%)	08(5.3%)

In the present study, maximum number of cases were encountered in the age group of 41-50 years.

Lathi A et al, (2011) reported maximum sinonasal lesions in the age group of 11-20 years (21.5%).

Nayak M et al (2015) reported maximum sinonasal lesions in the age group of 31-40years (27.61%).

Table 7: Comparison of sex distribution patterns of lesions of nose and paranasal sinuses in present study and other studies

Authors	Male	Female	Male:Female
Sharma R et al (2015) n=50	29(58%)	21(42%)	1.3:1
Maheshwari A et al (2017) n = 80	52(65%)	28(35%)	1.8:1
Present study	94(68.66%)	56(31.33%)	1.67:1

In the present study out of 150 cases, 94(68.66%) were males, 56(31.33%) were females with male to female ratio of 1.67:1.

Studies done by both Sharma R et al (2015) and Maheshwari A et al (2017) also noted male preponderance in lesions of nose and paranasal sinuses with male to female ratio 1.3:1 and 1.8:1. Our findings are in accordance with the above studies

Table 8: Comparison of histopathological spectrum of non-neoplastic lesions of nose and paranasal sinuses in present study and other studies

Authors	Kulkarni A. et al (2020)	Garg D. et al (2014)	Present study
Polyp	84 (68.85%)	60(40.81%)	20 (13.33%)
Fungal infections	5 (4.10%)	5 (3.40%)	120 (80%)

In the present study, the most common lesion was the fungal infections with 120 (80%) cases. Mucormycosis was the predominant fungal infection observed with 109 (72.66%) cases out of all fungal infections.

However, in the studies done by Garg D. et al (2014) and Kulkarni A. et al (2020) , nasal polyp was the most common lesion observed with 60 (40.81%) and 84 (68.85%) cases respectively.

Our findings are different from these studies, as present study was conducted in the study period when India along with the whole world has witnessed pandemic of COVID- 19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

There has been a rise in the number of cases of mucormycosis in patients with COVID-19 worldwide, particularly in India. The reason behind this is the favourable environment in the affected patients that allows the spores to grow. These include hypoxia, high glucose levels due to diabetes or steroid-induced hyperglycemia, acidic medium created by diabetic ketoacidosis or metabolic acidosis, high ferritin levels due to inflammation, and a decreased activity and count of white blood cells along with several underlying conditions that promote the germination of spores and lead to the catastrophic picture of rhino cerebral mucormycosis co-infection with COVID-19.

CONCLUSION:

Lesions in the nasal cavity, paranasal sinuses and nasopharynx are very common lesions encountered in the clinical practice and forms a heterogenous group of lesions with broad spectrum of histopathological features. Clinically differentiating non-neoplastic lesions from neoplastic lesions is almost impossible due to their similar clinical presentation and are mostly diagnosed as nasal polyps. It is often difficult to determine clinically which pathology lies underneath. This study have shown the importance of histopathological examination, which aids the clinician to differentiate non- neoplastic from neoplastic and benign from malignant lesions. It is necessary to diagnose these lesions to provide the patient with optimal treatment and better prognosis.

Conflicts Of Interest - None

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