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Research Article

Histomorphological Study of Lesions of Nasal Cavity, Nasopharynx and Paranasal Sinuses at Tertiary Care Center

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ABSTRACT

Background: The nasal cavity (NC), nasopharynx(NAP), and paranasal sinuses(PNS) are integral components of upper respiratory tract. These regions are vulnerable to diverse group of lesions with overlapping of clinical featureswhich may cause delay in diagnosis hence histopathological examination is crucial for definitive diagnosis and timely management.

Objectives: This study evaluates the histomorphological characteristics and clinicopathological correlation of neoplastic and non-neoplastic lesions in NC, NAP and PNS.

Methodology: Total 182 cases were analysed over a period of 3 years from October 2020 to October 2023 both prospectively and retrospectively. The tissue was fixed in 10% formalin with complete clinical and radiological data which was processed and stained with Haematoxylin& Eosin(H&E) for histomorphological evaluation.

Results:A total of 182 cases were studied of which 165(90.66%)were non-neoplastic and 17(9.34%)were neoplastic lesions. Nasal obstruction(41.2%) was the most common clinical presentation. The non-neoplastic and neoplastic lesions were commonly encountered in 2nd to 4th decade and 4th to 6th decade respectively. Out of 165 non-neoplastic lesions 62(34%) were of nonspecific chronic inflammation, 35(19.24%) of mucormycosis , 65(35.72%) were of nasal polyp and 3(1.64%) were of acute inflammatory lesions. Among 17 neoplastic lesions 16 were benign and 1 was malignant lesion. In benign lesions inverted papilloma 5(2.8%) was the commonest and one malignant case of chondrosarcoma (0.5%) was reported.

Conclusion: Clinical presentation of neoplastic and non-neoplastic lesions often overlap hence histopathology is crucial for categorization and definitive diagnosis for timely management.

Keywords: *Nasal polyp, Nasal obstruction, Mucormycosis.*

INTRODUCTION

Nose is the most prominent part of face having great aesthetic value and functional significance.[1] Filtering, humidifying the temperature of inspired air are done by the functional unit of nose named as the nasal cavity and the paranasal sinuses.[2]It comprises of epithelial, glandular, lymphoid, fibrovascular connective tissue, cartilage and bony elements. [3] Sino nasal area is exposed to various infective agents, chemicals, antigens, mechanical, and many other influences. As a result of these multifaceted exposures, various inflammatory conditions, infections and neoplasms can occur in the Sino nasal tract.[4]

The incidence of Sino nasal masses is 1-4% in the total population.[5] Many of these lesions present as nasal mass with obstruction.Nasal polyps have a prevalence of 4%.[6] Their pathogenesis is unknown but they have association with allergy, asthma, infections and aspirin sensitivity.[7].

In the neoplastic lesions, benign tumors were more frequent than malignant tumors.[8] Malignant lesions of the nose and PNS account for less than 1% of all malignancies and about 3 % of all head and neck malignancies.[9]

AIMS AND OBJECTIVES OF THE STUDY

1. To study the histomorphological features and clinical correlation of various lesions in nasal cavity, nasopharynx and paranasal sinuses.
2. To study the frequency and distribution of various lesions in nasal cavity, nasopharynx and paranasal sinuses.
3. To categorize neoplastic and non-neoplastic lesions in reference to age and sex differences.

MATERIALS AND METHODS

Retrospective and prospective study done for a period of 3 years from October 2020 to 0ctober 2023 in the department of Pathology, Raichur Institute of Medical Sciences, Raichur.Clinical and radiological details were obtained from histopathology requisition forms and medical records section, RIMS, Raichur. Institutional Ethical Committee approval was obtained for study.

10% formalin fixed tissue were processed and stained with Haematoxylin& Eosin(H&E) for histomorphological evaluation. Periodic acid Schiff (PAS) and Grocott's methenamine silver stain(GMS) were done where ever required.

182 cases were analysedhistomorphologically and the lesions were categorized. Statistical analysis was done by using SPSS 30 (IBM) software.

RESULTS

In the present study of total 182 cases, non-neoplastic lesions were 165cases which account for 90.66% and neoplastic lesions were 17cases which account for 9.34%(Table 1).

TABLE 1: DISTRIBUTION OF TOTAL CASES

Distribution of cases:	Numbers	Percentage
Non neoplastic	165	90.66%
Neoplastic	17	9.34%
Total	182	100%

In the present study age of presentation ranges from 1-80years. A maximumof 82 cases (45.05%) were observedin individual aged 21-40years followed by 56 cases (30.76%) in 41-60years, 33 cases (18.13%) in 1-20years and 11cases (6.04%) in 60-80years of age group respectively. The highest number of non-neoplastic cases were seen in the age group of 21-40yrs and neoplastic cases were seen between 41-60 yrs as depicted in (Figure 1).

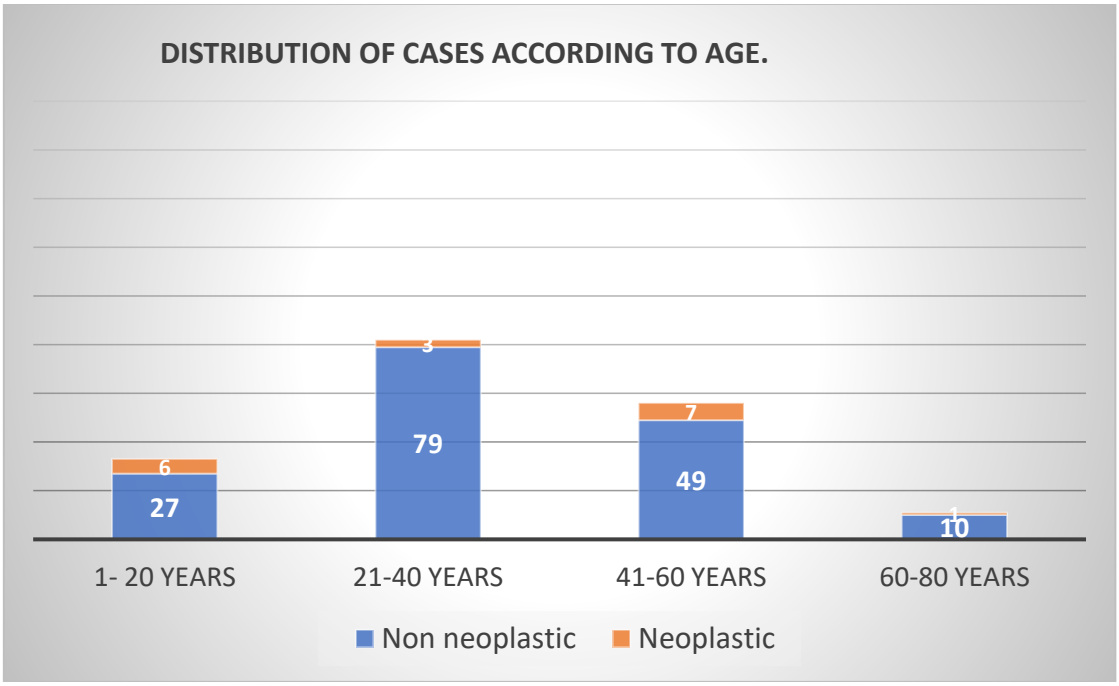

Fig1: Distribution of cases according to age.

In the present study out of 182 cases, males were 97(53.29%) and females were 85(46.71%) with a ratio of 1.14:1. Male preponderance was seen in non-neoplastic cases and a slight female preponderance was seen in neoplastic cases (Table2).

Table 2: DISTRIBUTION OF CASES BASED ON GENDER

Gender	Non neoplastic	Neoplastic	Total	Percentage (out of 182 cases)
Male	92	05	97	53.29%
Female	73	12	85	46.71%
Ratio	1.26:1	0.41:1	1.14:1	100%

Among 182 cases, 101(55.5%) cases were located in paranasal sinuses, followed by 78 (42.86%) cases in nasal cavity and 3 (1.64%) cases in nasopharynx respectively.

Themost common symptom wasnasal obstruction 75 (41.2%) followed by headache 46 (25.27%). Facial pain/eye pain 27 (14.83%) and nasal discharge 6 (3.29%) were exclusively associated with non-neoplastic lesions. Nasal bleed 4 (2.19%) was more common in neoplastic lesions. Other symptoms like cheek swelling and black discharge were also observed (Table 3).

Table 3: CLINICAL PRESENTATION OF CASES

Clinical presentation	Non neoplastic	Neoplastic	Total	Percentage
Nasal obstruction	68	07	75	41.20%
Headache	44	02	46	25.27%
Facial pain/eye pain	27	-	27	14.83%
Nasal mass	08	03	11	6.04%
Difficulty in breathing	08	01	09	4.94%
Nasal discharge	06	-	06	3.29%
Nasal bleed	01	03	04	2.19%
Cheek swelling	02	-	02	1.09%
Others (black discharge, nasal stuffiness)	01	01	02	1.09%

A total of 165non-neoplastic lesions of which 100 cases (60.6%) wereof inflammatory lesions and 65 (39.4%) cases were of nasal polyp. Among inflammatory lesions chronic inflammation accounts for 97 cases (58.8%) and 3cases (1.8%) were of acute inflammation.
Chronic inflammatory lesions include 62 cases (37.8%) of chronic nonspecific lesions and 35cases (21.2%) of chronic specific inflammatory lesions (mucormycosis).65 cases of Nasal polyps were found of which 49cases (75.4%) were inflammatory and 16cases (24.6%) were allergic nasal polyps
(**Table 4& Figure 2**).

TABLE 4: DISTRIBUTION OF NON-NEOPLASTIC LESIONS

Non neoplastic lesions	Numbers	Percentage (of non-neoplastic cases)	Percentage (of total cases)
Inflammatory lesions	100	60.6%	54.94%
• Acute	03	1.8%	1.64%
• Chronic	97	58.8%	53.3%
-Non-specific (CNSI)	62	37.6%	34.1%
-Specific (Mucormycosis)	35	21.2%	19.2%
Nasal polyp	65	39.4%	35.72%
- Inflammatory polyp	49	29.7%	26.9%
- Allergic polyp	16	9.7%	8.8%
Total	165	100%	90.64%

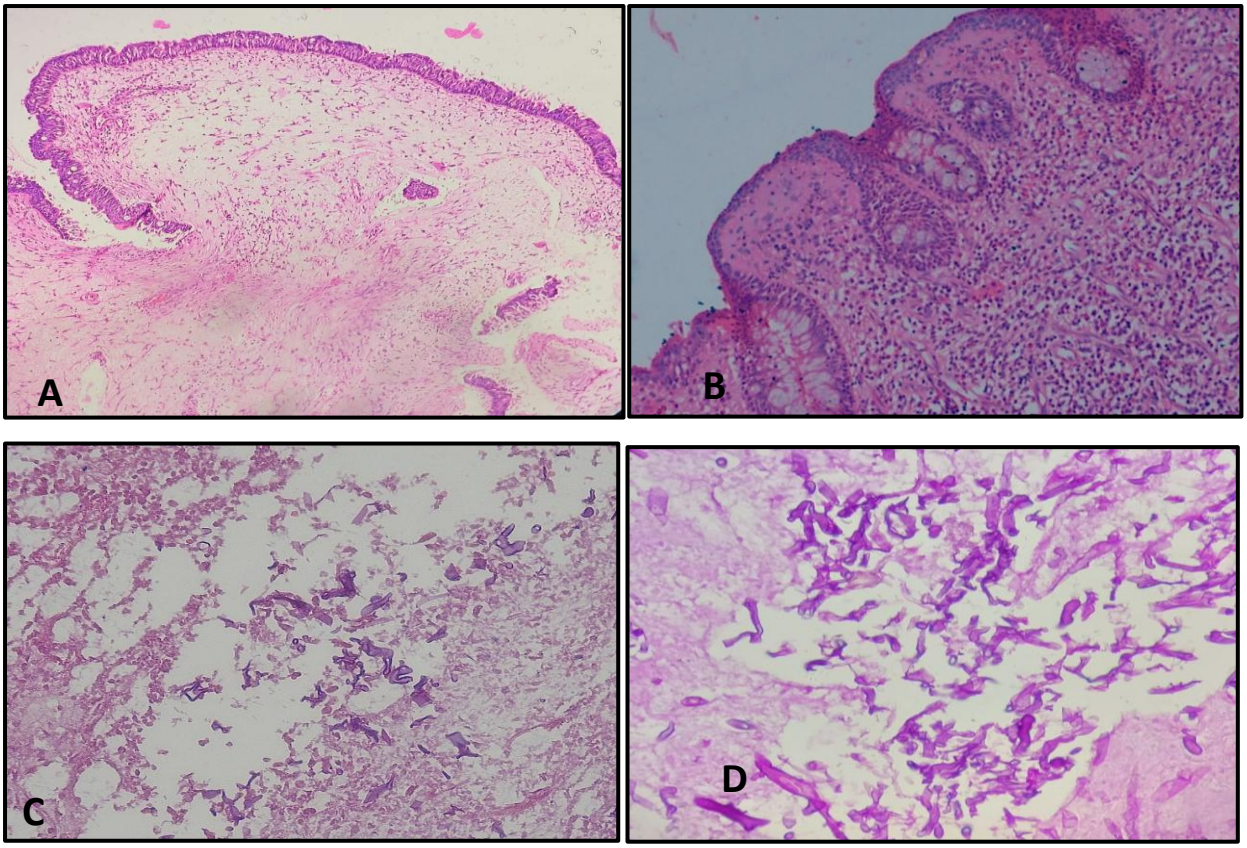

Figure 2) A: Showing allergic polyp covered by respiratory epithelium with underlying oedematous stroma (H&E 10X). **B**: Inflammatory Polyp showing squamous metaplasia &Stroma showing dense mixed inflammatory cell infiltrate (H&E 10x).**C**:Chronic specific inflammation- mucormycosis showing broad aseptate ribbon like hyphae (H&E 40X). **D:** PAS stain highlighting the fungal elements of mucormycosis.

As depicted in table 5 maximum number of non- neoplastic both inflammatory lesions (47 cases) and nasal polyp (32 cases) were seen in 21-40yrs age group followed by 41-60yrs for inflammatory lesions (37 cases) and 1-20yrs for nasal polyp (21 cases).

Table 5: DISTRIBUTION OF NON-NEOPLASTIC LESIONS IN DIFFERENT AGE GROUPS

AGE GROUP	INFLAMMATORY LESIONS	NASAL POLYP	TOTAL
1-20Yrs	06	21	27
21-40Yrs	47	32	79
41-60Yrs	37	12	49
61-80Yrs	10	0	10
TOTAL	100	65	165

In our study17 cases were neoplastic lesions, out of which 16 cases (94.12%) were benign and 1 case(8.8%) was malignant(Table 6).

Table 6:DISTRIBUTION OF NEOPLASTIC LESIONS

Neoplastic lesions	Number of cases	Percentage (of neoplastic)	Percentage (of total)
Benign	16	94.12%	8.8%
Malignant	01	5.88%	0.54%
Total	17	100%	9.34%

In our studymaximum cases of benign neoplastic lesions which include Inverted papilloma 5 cases (2.8%) followed by, haemangioma 3 cases (1.7%), Angiofibroma 3 cases (1.7%), osteoma 2 cases (1.1%), 1 case (0.5%) of each fibroepithelial polyp, chondroma and schwannoma respectively were seen in age group of 1-20yrs and 41-60yrs. Malignant case was seen in 4th to 6th decade. Maximum preponderance was seen in females among neoplastic lesions(Table 7& Figure 3).

TABLE 7: AGE WISE AND SEX WISE DISTRIBUTION OF NEOPLSTIC LESIONS

BENIGN NEOPLASTIC	1-20Yrs	21-40Yrs	41-60Yrs	61-80Yrs	MALE	FEMALE	TOTAL
HEMANGIOMA	03	-	-	-	-	03	03
INVERTED PAPILLOMA	-	01	03	01	01	04	05
ANGIOFIBROMA	02	-	01	-	02	01	03
OSTEOMA	-	01	01	-	01	01	02
FIBROEPITHELIAL POLYP	01	-	-	-	01	-	01
CHONDROMA	-	01	-	-	-	01	01
SCHWANNOMA	-	-	01	-	-	01	01
MALIGNANT: - CHONROSARCOMA	-	-	01	-	-	01	01
TOTAL	**06**	**03**	**07**	**01**	**05**	**12**	**17**

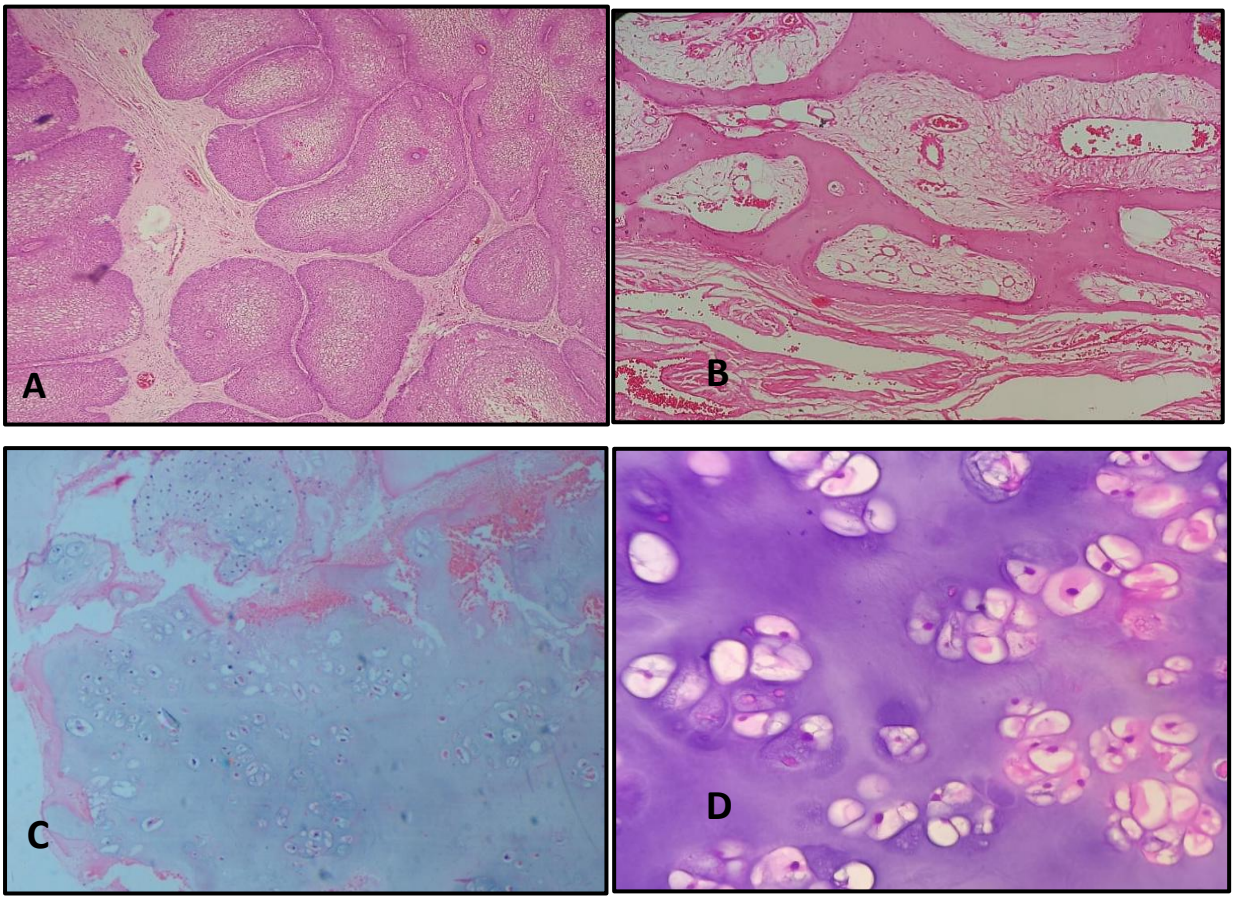

Figure 3) A: Inverted papilloma with typical inverted pattern of growth (H&E10X).**B**: Osteoma showing admixture of woven and lamellar bone with haversian canal (H&E 10X).**C:** Chondroma showing closely packed lobules of chondroid tissue separated by fibromyxoid stroma (H&E 10X).**D**: Chondrosarcoma showing lobules of chondrocytes showing mild pleomorphism, enlarged, mild hyperchromatic nuclei and some showing binucleation (H&E 10X).

In present studymaximum correlation was found for haemangioma (100%) and osteoma (100%) where 3 cases were reported as haemangioma and 2 cases reported as osteoma both clinically and histomorphologically**.** Chondrosarcoma was reported as clinical diagnosis in 2 cases which show correlation of 50% of which one case was diagnosed as

chondrosarcoma and other as chondroma on histopathology. Clinical and histomorphological correlation was found to be statistically significant (P value 0.000014) as depicted in the(Table8).

TABLE 8: CLINICAL AND HISTOMORPHOLOGICAL CORRELATION

Clinical diagnosis	Number of cases	Histomorphological diagnosis	Number of cases
Nasal polyp	62	Inflammatory polyp Acute inflammation Angiofibroma Inverted papilloma CNSI	58 1 1 1 1
Fungal sinusitis	59	Fungal sinusitis CNSI Inflammatory polyp Acute inflammation	34 21 3 1
Chronic rhinosinusitis	43	CNSI Inflammatory polyp Acute inflammation Mucormycosis	40 1 1 1
Inverted papilloma	5	Inverted papilloma Schwannoma	4 1
Haemangioma	3	Haemangioma	3
Angiofibroma	3	Angiofibroma Inflammatory polyp	2 1
Osteoma	2	Osteoma	2
Chondrosarcoma	2	Chondrosarcoma Chondroma	1 1
Cystic mass	3	Fibroepithelial polyp Inflammatory polyp	1 2

DISCUSSION

Masses in nasal cavity form a heterogeneous group of lesions with a broad spectrum of histopathological features. The lack of differentiation between neoplastic and non-neoplastic lesions clinically will delay the diagnosis and treatment. [1] Histopathologic categorization is essential in the management of these lesions because of different treatment modality and emotional burden on the patient.

In the present study a total of 182 cases were studied of which 165(90.66%) were non neoplastic lesion and 17(9.34%) were neoplastic lesions. Similar findings were seen in study done by Aparna M et al [10], Hemant chopra et al [11], Seema et al [12] and Bistel al [13](Table 9).

TABLE 9: COMPARISION OF TOTAL CASE DISTRIBUTION WITH PRESENT STUDY

Lesions	Aparna M et al [10]	Hemant chopra et al [11]	Seema et al [12]	Bistel al [13]	**Present study**
Non neoplastic	86%	84%	67%	56.4%	**90.66%**
Neoplastic	14%	16%	33%	43.6%	**9.34%**
Total	100%	100%	100%	100%	**100%**

In the present study, the age range of the patient varied from 1 to 80 years. Majority of the patients were in the age group of 21-40 years (45.05%), followed by 41-60 years (30.76%), which was consistent with study done by Vijaya v mysorekar et al [14], T. Dinesh singh et al [15](table 10).

TABLE 10: COMPARISON OF AGE WISE DISTRIBUTION OF NASAL LESIONS WITH PRESENT STUDY

Age group	Vijaya v Mysorekar et al [14]	T. Dinesh singh et al [15]	Parajuli &Tuladhar's Study [16]	**Present study**
1-20yrs	47(32.4%)	14(39.9%)	58(39.18%)	**33(18.13%)**
21-40yrs	52(35.86%)	15 (42.85%)	57(38.50%)	**82(45.05%)**
41-60yrs	38(26.2%)	6(17.13%)	27(18.24%)	**56(30.76%)**
61-80yrs	8(5.5%)	0(0%)	6(4.05%)	**11(6.04%)**
total	145	35	148	**182**

A slight male predominance was observed in present study with a male to female ratio of 1.14:1. Similar findings observed with study done by Vijaya v mysorekar et al [14] and T. Dinesh singh et al [15],. S. R. Dafale et al [17] and Harshad's [18]study(Table 11).

TABLE 11: COMPARISON OF SEX WISE DISTRIBUTION WITH PRESENT STUDY

Study	Harshad's study [16]	S. R. Dafale et al [17]	Vijaya v mysorekar et al[14]	T. Dinesh singh et al [15]	**Present study**
Male	35	45	85	20	**97**
Female	17	25	60	15	**85**
Total cases	52	70	145	35	**182**
Male to female ratio	2.06:1	1.8:1	1.42:1	1.33:1	**1.14:1**

Nasal obstruction was the most common clinical presentation in 75 cases (41.20%) out of 182 and similar results were observed in the studies done by Lathi A et al [18], Maheshwari et al [19] with nasal obstruction as the most common clinical presentation with 108 (97.3%) cases, 71 (88.75%) cases respectively.
In present study nasal polyp constitutes 65 cases (39.4%) among non-neoplastic cases out of total 180 cases (35.72%). Similar findings with more cases of nasal polyp was observed in the study done by Vijaya v mysorekar et al [14] and Dafale SR et al [17](Table 12).

TABLE 12: NON-NEOPLASTIC LESION COMPARISION WITH PRESENT STUDY

STUDY	Total no of cases	polyp	mucormycosis
Vijaya v mysorekar et al [14]	102	86(84.31%)	02(1.96%)
Dafale SR et al [17]	62	41(66.13%)	02(3.23%)
Present study	**182**	**65(35.72%)**	**35(19.2%)**

Inverted papilloma 5 cases (2.8%) were the commonest benign neoplastic lesion in our study followed by haemangioma and angiofibroma similar most common benign lesions was reported by Hemant chopra et al [11], Parajuli &Tuladar's[16].Karansinh et al [20]. Nepal A. et al [21] and Seema et al [12] in their study found hemangioma as most common benign lesion followed by inverted papilloma(Table 13).

TABLE 13: COMPARISION OF TYPES OF NEOPLASTIC- BENIGN LESIONS WITH PRESENT STUDY

STUDY	Inverted papilloma (%)	Hemangioma(%)	Angiofibroma (%)
Hemant chopra et al [11]	04(36.36%)	03(27.27%)	03(27.27%)
Parajuli &Tuladar's study [16]	06(31.58%)	05 (26.32%)	03(15.79%)
Nepal A. et al [21]	09(23.68%)	11(28.95%)	01(2.63%)
Karansinh et al [20]	12(19.35%)	10 (16.13%)	33(53.23%)
PRESENT STUDY	**5(31.2%)**	**3(18.7%)**	**3(18.7%)**

Chondrosarcoma constitutes approximately 15% of all primary malignant bone tumors. Chondrosarcoma of the nasal septum is rare and is sometimes difficult to suspect on physical examination and differentiating low grade chondrosarcomas from chondromas is also difficult radiologically.
The malignant lesions were predominant in the sixth decades in our study, similar findings were observed in the study by Frazell& Lewis [22] and Ghosh & Bhattacharya [23] who reported a maximum number of malignant cases in the fifth to seventh decades.

CONCLUSION

In clinical practice lesions of the Nasal Cavity, Nasopharynx and Paranasal sinuses are commonly encountered and it affects any age group. Histopathology plays an integral role in diagnosing and categorizing the lesions as well as it aids in identifying the host response to various lesions. Though histopathology is gold standard but Multidisciplinary approach (clinical, radiological and histopathological examination) aids in appropriate management of the lesions of nasal Cavity, nasopharynx and paranasal sinuses at the earliest.

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