

Histopathological profile of space occupying lesions (SOL) of Nasal cavity, paranasal sinuses(PNS) and nasopharynx

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Abstract

Background: Nasal, paranasal sinuses (PNS) and nasopharyngeal lesions are a common finding in patients of all age groups, showing different type of pathology eg inflammatory, benign and malignant. A thorough clinical examination, imaging studies and histo-pathological examination is necessary for the proper management. The aim of our study is to find out the histopathological features of cases presenting as mass (Inflammatory or neoplastic) in nasal cavity, nasopharynx and PNS. **Material and method:** The study was conducted in the department of pathology GMC, Kota during January 2018 to Dec 2019. **Result:** Total 87 cases were observed among which Non-neoplastic lesions are commoner than neoplastic lesions in the nasal cavity and PNS. Among neoplastic lesions, 13 (48.14%) cases were benign-commonest is Hemangioma and 14 (51.85%) cases were malignant-commonest shares both squamous cell carcinoma and Adenocarcinoma.

Keywords: nasal, paranasal sinuses lesion

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Introduction

Nasal, PNS and nasopharyngeal lesions are a common finding in patients of all age groups. The presenting symptoms of all masses, whether inflammatory, benign or malignant, are almost similar and hence a thorough clinical examination becomes necessary for provisional diagnosis. By use of advance imaging techniques like CT scan, MRI, Endoscopy etc., a presumptive diagnosis is often made. However it is a careful histopathological examination which decides the nature of any particular lesion and mostly in all cases, gives a final diagnosis. Hence it makes the clinician implement, correct and timely interventions, which leads to a better prognosis. Certain benign lesions e.g. Exophytic papilloma of sinonasal region, are benign and are never premalignant. So simple excision is the only line of treatment. Certain other Benign lesions e.g. Inverted papilloma and Oncocytic papilloma are premalignant and have to be treated by wide excision. The nasal cavity, PNS and nasopharynx form a functional unit, which is lined by stratified squamous, respiratory type pseudostratified columnar and transitional (intermediate) epithelium. The nasal cavity is to serve various functions i.e. nasal respiration, protection of lower airway and olfaction. Additionally it provides drainage for all the PNS. The non-neoplastic cases are very high in percentage. In neoplastic cases the malignant cases are high than benign. For the diagnosis of these cases we require clinical findings, CT/MRI findings and finally histo-pathological investigation including special stains and immunostains. This study being done in tertiary level hospitals and it assumes immense values, it helps in analyzing the histopathological diagnosis and draws a definitive protocol for management of these lesions[1-4]

Aims and objectives

1. To find out the histopathological features of cases presenting as mass (Inflammatory or neoplastic) in nasal cavity, nasopharynx and PNS
2. Classify them as malignant and benign and find out the relative incidence of lesion to compare with other studies.

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Material and methods

Study area : Department of Pathology, Govt. Medical College Kota
Study design : Laboratory based descriptive type of observational study.

Study period : January 2018 to December 2019.

Sampling technique : Every eligible specimen.

Sample size: A prospective study was carried out to study 87 cases of space occupying lesions of nasal cavity, nasopharynx and paranasal sinuses, which were received in the Department of Pathology, Medical College, Kota Tissue received were processed histopathologically, grossly and microscopically and the slides were stained with routine H&E stain. Special stains were used where needed like PAS, RS, MC, MT etc

Inclusion criteria:-

Medically treatable cases for confirmation of diagnosis.

Medically untreatable cases for final diagnosis.

Cases in which the provisional diagnosis is difficult to make.

Cases which need follow-up.

Exclusion criteria:- Nil

Observation

Out of 87 cases, 85 cases are SOLs of nasal cavity and PNS while 2 cases were of nasopharynx. In the present study, the age of patients with SOLs of nasal cavity and PNS ranged from 10 to 90 years. The maximum number of cases were seen in 3rd and 4th decades with 38 cases (44.70%). Only four cases (4.70%) were noticed in age group of 71 and above. Out of the 85 cases, 50 were males (58.82%) and 35 were females (41.17%). The male to female ratio was 1.43:1. Thus these lesions are more common in males. 43 (50.58%) cases were nasal and 42 (49.41%) were paranasal in the present data. Non-neoplastic lesions are commoner than neoplastic lesions in the nasal cavity and PNS. Among neoplastic lesions, 13 (48.14%) cases were benign and 14 (51.85%) cases were malignant. non-neoplastic lesions of nasal cavity and PNS are most common in the 2nd and 3rd decades of life. out of 58 non-neoplastic lesions, 37 (63.79%) cases are in males and 21 (36.20%) cases in females. While 20 cases are nasal and 38 are paranasal. Table- 1 indicates that inflammatory polyps form the most common histological diagnosis with 46 cases (79.31%).

Table 1 : Histological diagnosis of Non-neoplastic lesions of Nasal cavity and Paranasal sinuses.

Histological diagnosis	Number of cases	Percentage (%)
Inflammatory polyp	46	79.31
Rhinosporidiosis	01	1.72
Other fungal infections	07	12.06
Chronic sinusitis	03	5.17
Rhinoscleroma	01	1.72
Total	58	100

Inflammatory polyps form the most common histological diagnosis with 46 cases (79.31%) .Grossly, they are pearly white to whitish soft tissue bits ranging in size from 1-5 cm. Cut surface of them showed mucoid change. Microscopically, they exhibited the lining of pseudo-stratified ciliated columnar epithelium underneath which there was loose mucoid stroma in almost all of the cases containing mucous glands. Stroma was infiltrated by lymphocytes, plasma cells and eosinophils. Fungal infection like Rhinosporidiosis - One case (1.72%) seen in fourth decade presenting as polypoidal mass with nasal obstruction, discharge & epistaxis and in microscopic examination, showed many diagnostic globular sporangia containing numerous spores. Other fungal infection -There are 7 cases (12.06%) of fungal infections, presenting with foul smelling discharge and on microscopy exhibit inflammation with neutrophils and histiocytes in the granulation tissue. Aspergillosis was the commonest fungal infection with 1 case of mucormycosis. 3 cases of chronic sinusitis are exhibiting mixed acute and chronic inflammatory infiltrate within stromal tissue. Neoplastic tumor like benign tumor is not seen <10 years. 05 cases of benign neoplastic lesions are in males and 08 cases in females. Out of 13 benign neoplastic lesion 12 are seen in nose and 1 in PNS Therefore, it is clearly evident that nasal cavity forms the most common site of occurrence of benign neoplastic lesions in the present study[5-8].

Table 2 :Histological diagnosis of Benign Neoplastic lesions of Nasal cavity and PNS

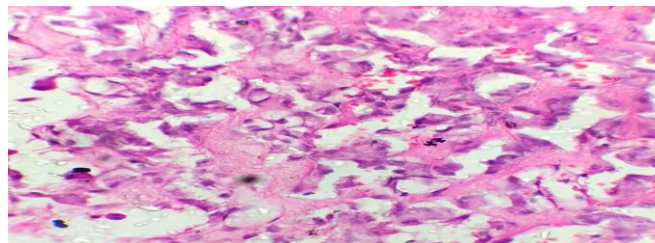
Histological type	Number of cases	Percentage (%)
Inverted papilloma	03	23.07
Hemangioma	08	61.53
Myoepithelioma	01	7.69
Angiofibroma	01	7.69
Total	13	100

It is seen that Haemangioma (8 cases) is the most common benign neoplastic lesion in the present data. Inverted papilloma - (3 cases) presented with nasal obstruction, mass and epistaxis.

M/S, they are composed of invaginations of squamous epithelium into the underlying stroma.

Angiofibroma - There is 1 case of angiofibroma, presents with obstruction and bleeding. Grossly appeared as grayish white soft tissue masses of variable size. M/S, show varying sized blood vessels in fibrous stroma which varies from moderately cellular to collagenised.

Myoepithelioma- 1 case of myoepithelioma presents with nasal obstruction left side . Histomorphologically , myoepithelial cells present among myxoid stroma.

**Photomicrograph I: Myoepithelioma- Showing polygonal cells with clear to feathery cytoplasm and small central bland nuclei with visible nucleoli. Cells are forming irregular nests and line irregular elongated spaces. Stroma is hyalinised. (H&E, 400x).**

Capillary hemangioma – 8 cases of hemangioma present with nasal obstruction and bleeding. Histologically, capillary hemangioma showed capillary sized blood vessels intricately admixed with stroma. Neoplastic malignant lesions range from 4th decade to older adults in 7th decade but age group 50 years is at the highest risk in the present study. Malignant lesions of nasal cavity and PNS are more common in males (8 cases). Nasal cavity (11 cases) is more common site for malignant lesions in the present study.

Table 3:Histological diagnosis of Malignant Neoplastic lesions of Nasal cavity and PNS

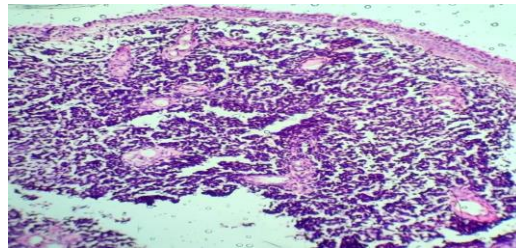
Histological diagnosis	Number of cases	Percentage (%)
Squamous cell carcinoma	03	21.42
Sino-nasal undifferentiated carcinoma	01	7.14
Non-Hodgkin's Lymphoma	01	7.14
Basal cell carcinoma	01	7.14
Adenocarcinoma	03	21.42
Plasmacytoma	01	7.14
PNET/Ewing's sarcoma	01	7.14
Adenoid cystic carcinoma	01	7.14
Malignant melanoma	02	14.28
Total	14	100

According to present study, squamous cell carcinoma and adenocarcinoma are the most common malignant histologic types[9-11]

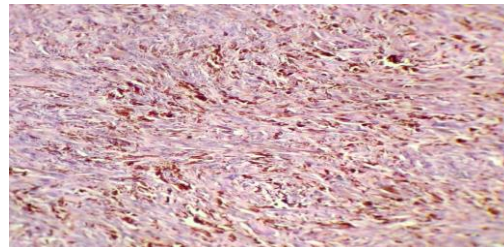
Squamous cell carcinoma (SCC) - There are 3 cases (21.42%) of SCC. They have presented in 50-80 years of age. 1 case is male and 2

cases are female patients. They have presented with obstruction, bleeding, swelling of nose or cheek, headache, discharge and proptosis. They grossly appear as grayish white soft tissue bits ranging from less than 1 cm to few cms in size. Microscopically, all are keratinizing and well differentiated SCC. Histologically , tumor

cells are arranged in nests, masses or groups with the evidence of squamous differentiation in form of intracellular keratin, intercellular bridges and extracellular keratin pearls. Sino-nasal undifferentiated carcinoma - There is one case (7.14%). It presents in 51-60 years of age, male patient. Present with obstruction, bleeding, and with pain, discharge and with swelling in nose. Microscopically, there are hypercellular proliferation with varied growth, including trabecular, sheet-like, ribbon, solid, lobular and organoid patterns seen. The cellular infiltrate consist of polygonal cells composed of medium to large sized, round to oval, hyperchromatic to vesicular nuclei, inconspicuous to prominent nucleoli, and a varying amount of eosinophilic appearing cytoplasm with poorly defined cell membranes. The nucleocytoplasmic ratio is high. Increased mitotic activity is present including atypical mitoses and there is often prominent tumor necrosis.



Photomicrograph II: PNET/Ewing's Sarcoma - Showing metaplastic and mildly dysplastic respiratory epithelium, round cell proliferation, multiple vessels showing endothelial proliferation. Occasional rosettes and perivascular arrangement of cells. (H&E, 100x)
Malignant melanoma – Two cases of malignant melanoma is seen in 51-60 years of age, male patient, presenting with bleeding and obstruction. Microscopically, tumor cells are arranged in groups and nests with prominent nucleoli and plenty of mitotic figures. The cytoplasm is abundant and show brownish black pigment.



Photomicrograph III: Malignant melanoma. (H&E, 100x)

In the present study, 2 cases of space occupying lesions of nasopharynx were received at Department of Pathology, Government Medical College Kota from, from period of January 2018 to December 2019.

Discussion

Out of the total 85 lesions of nasal cavity and PNS, 58(68.23%) were non-neoplastic lesions. Among it majority were Inflammatory polyp 46 (79.31%). Remaining lesions included Fungal infections 07cases (12.06%), Chronic sinusitis 03 cases (5.17%), Rhinosporidiosis 01 case (1.72%), Rhinoscleroma 01 case(1.72%).The incidence of inflammatory polyp (46 cases) in our study is 79.31 % of non-neoplastic lesions of nasal cavity and PNS. Inflammatory polyp constitutes as the most common non-neoplastic sinonasal mass and distributed amongst a wide age

group (10-82 years). Study was also done by Tondon et al, in 1971 shows 64% cases, Dasgupta et al shows 62.5% cases in 1997 and Zafar et al, in 2008 reported the incidence of inflammatory polyp as 82.06%cases of all non-neoplastic lesions. The result of study done by Zafar et al, 2008 is closest to the present study. Maximum cases are in second and third decades of life, which is comparable with Ghosh and Bhattacharya (1966) & Zafar et al(2008). Whereas Compagno et al (1976) are having their maximum cases in the first decade of life. Polyps are Commoner in nasal cavity in all studies excluding our study. Incidence of polyp in PNS is higher in our study in comparison to other studies. In the present study, we found one case of rhinosporidiosis forming 1.72% of total cases of nasal cavity

Plasmacytoma – It is seen in a 40 years old female patient with nasal mass. Microscopically, shows monomorphic infiltration by plasma cells ranging from mature to immature and anaplastic.

Adenoid cystic carcinoma – It is observed in a 65 years old female patient, presenting with nasal obstruction and bleeding. Microscopically, show gland with cribriform pattern, pseudocyst and true cysts, filled with eosinophilic material .

Basaloid cells with hyperchromatic nuclei and pleomorphism seen.PNET/Ewing's sarcoma – One case seen in 66 years old female patients, come with complaints of obstruction of nose and bleeding from nose. Microscopically, there are highly cellular monomorphic tumor cells divided into discrete nests by thick fibrous septae. The cells are small with a high nucleocytoplasmic ratio and scant cytoplasm .Mitotic activity is scanty and rich vascular network is seen[12-16]

and PNS lesions. The study conducted by Bjerregaard et al (1992) was found to be 3.3% of all non-neoplastic lesions which is far more and seven cases of other fungal infections including one case of Mucormycosis and four cases of Aspergilloma. Yao Shi Fu, 1974 observed that invasive fungal sinusitis in acute fulminant form occur in immunosuppressed patients. In Mucormycosis, the fungi are seen as broad, ribbon-like, hyaline, aseptate hyphae, with a branching pattern of 45 to 90 degrees as seen in our case. In Aspergilloma, the fungi are seen as tightly packed septate hyphae with regular branching. The angle of the regular branching is approximately 45 degree as seen in our cases. in our study, out of 58 non-neoplastic lesions, three cases are of non-specific inflammation. This is probably because of biopsy has been taken from the wrong site or inadequate biopsy has been taken. No follow up information about these patients is available.Rhinoscleroma is an inflammatory disease of the nose, pharynx, and larynx caused by an organism of the Klebsiella group. There is single case seen in 36 years old male in our study forming 1.72% of all non-neoplastic lesions of nasal cavity and paranasal sinuses. The study conducted by Zafar et al, (2008) was found to be 4.83% of all non-neoplastic lesions which is far more than the present study.In present study 68.23% are non-neoplastic which is slightly higher than study by Zafar et al (2008) in which 60% lesions are non-neoplastic. The presentation age of non-neoplastic lesions in present study ranged from 1st to 9th decade of life which is comparable to Zafar et al (2008). The sex ratio in our study is 1.76:1 which is comparable to sex ratio (1.7:1) by Zafar et al. Paranasal sinuses are

the predominant site of involvement with 65.51% of non-neoplastic lesions. Which is higher than the other studies. In our study, there are 27 neoplastic cases with 13 benign (48.14%) and 14 malignant (51.85%). Buchanan and Salvin (1972) had observed 21.81% benign tumors and 78.16% malignant tumors in their study which is not in accordance to present study. In our study as well as in that of Tondon et al (1971), the incidence of papilloma is comparable. Age incidence in our study is maximum in 21-40 years age group. Snyder et al and Lasser et al found in their studies that incidence of squamous papilloma are higher in males than in females. In the present study, there are 2 males and 1 female forming M:F ratio of 2:1. Buchanan & Salvin (1972) and Bielamowicz et al (1993) observed male preponderance in their studies. Thus it appears that papillomas are more common in males. In the present study and in literature, all studies show a similar male preponderance. In the present study, symptoms noted were nasal obstruction and discharge which is comparable to Lasser et al (1976). In our study, all three cases involve only the nasal cavity. Hyames (1971), Lasser et al (1976) and Panchal et al (2005) also observed the nasal cavity as commonest site. All our cases are inverted papillomas. Panchal et al (2005) observed inverted papillomas in 80% of cases. However, Hyames (1971) had observed that exophytic papilloma was the commonest type. Yao Shi Fu et al (1974) have described capillary hemangiomas as the most common hemangiomas in nasal cavity and paranasal sinuses which is similar to present study in which we found eight cases of capillary hemangioma. In the present study, we found eight cases all presented with obstruction and bleeding, which is consistent with findings of Yao Shi Fu et al, who noted it in 80% cases. Microscopically, these tumors were composed of lobules of thin walled capillary channels around a central blood vessel which is similar to Yao Shi Fu et al study. In the present study, we found one case of Angiofibroma of nasal cavity constituting 7.69% of all benign neoplastic sinonasal lesions. In the present study, age is 11 years, which is similar to Tiwari et al (2000) in which ages ranged from 7 to 22 years with average age of 15.4 years. We had one case of Angiofibroma which presented at 11 years of age. This is similar to studies done by Gullane et al (1992). In study done by Tiwari et al and Gullane et al, the cases were male, similar to our study. In our study, case presented with epistaxis and nasal obstruction, which is also a similar presentation in case of Tiwari et al and Gullane et al. Microscopically, angiofibroma —mas are composed of a characteristic fibrous stroma in which vascular channels of variable size, lined by flat endothelial cells, were found. Myoepithelioma is a rare benign tumor, most frequently found in the salivary glands. The extrasalivary gland involvement is even rarer and just few cases involving the sinonasal region have been reported in the literature. In present study, one case of myoepithelioma in the paranasal cavity of 22 years old male patient is observed. Microscopically, myoepithelioma is composed of polygonal cells with clear to feathery cytoplasm and small central bland nuclei with visible nucleoli. Cells are forming irregular nests and line irregular elongated spaces. Stroma is densely hyalinised. Malignant tumors of nasal cavity and paranasal sinuses are uncommon. In the present study of 85 cases of lesions of nasal cavity and paranasal sinuses, 14 are found to be malignant. Percentage incidence in this study is 16.47% which is comparable to Khan et al, 2006 (16.67%). In the present study, ages affected were from 31-40 years to 61 years of age. One case of 90 years presented with Non-Hodgkin Lymphoma of nasal cavity. Robin and Powell et al (1979) found in their study that incidence of cancer increased from 35 years onwards, reaching a peak at 55-59 years in men and 60-64 years in women. In the present study, incidence of sinonasal malignancy was more common in male 08 cases (57.14%) compared to 06 cases (42.85%) in females. This agrees with the studies conducted by Lewis and Castro et al, Hopkin et al and Harbo et al. Total number of malignancies described in this study is 14. We observed 3 cases (21.42%) of Squamous cell carcinoma which is lower compared to the study of Hopkin et al (1984), Khan et al (2006), and Harbo et al (1997). Lewis and Castro (1972) noted higher frequency

(64.0%) of Squamous cell carcinoma. In the present study, we observed 3 cases (21.42%) of Adenocarcinoma which is higher than the study of Harbo et al (13%), Panchal et al (6.5%) and Khan et al (5%). The non-salivary adenocarcinomas represent about 10% to 20% of the sino-nasal malignancies. We noted 2 cases (14.28%) of Malignant melanoma which is higher than the study of Lewis and Castro (4.0%), Hopkin et al (7.0%) and Harbo et al (9.0%). In present study, we noted 1 case (7.14.0%) of Adenoid cystic carcinoma which is comparable to the study of Khan et al (5.0%), Hopkin et al (7.0%) and Harbo et al (6.0%). We noted 1 case (7.14%) of PNET (primitive neuroectodermal tumor) which is higher as compared to the study of Bist et al, 2012 (4.2%). In the present study, we noted 1 case (7.14%) of sino-nasal undifferentiated carcinoma which is comparable with the study of Khan et al (7.5%). In the present study, we encountered 1 case of plasmacytoma in 40 years old female which is comparable to single case observed by Modh et al, 2013. Extramedullary plasmacytoma is uncommon tumor with worldwide annual incidence of 3 per 100,000 populations. It accounts for all 1% of all tumors of head and neck and 4% of all nonepithelial tumors of nasal tract. In the present study, we noted 1 case (7.14%) of Non-Hodgkin's Lymphoma which is lower compared to the study of Harbo et al (14%). Much is known about Basal cell carcinoma of nasal cavity but literature does not show individual papers on the subject. Nasopharyngeal mass is not an uncommon clinical entity. Such masses may either arise in nasopharynx or arise from neuroectoderm or the nose and paranasal sinuses and present in nasopharynx. Most authors have excluded lesions of nasopharynx. These factors lead to difficulty in finding out the exact incidence of various lesions. Amongst the non-neoplastic lesions adenotonsillar hypertrophy is most common. The most common benign masses of nasopharynx include adenoidal tissue, antrochoanal polyp, and juvenile nasopharyngeal angiofibroma. In the present study, 2 cases of space occupying lesions of nasopharynx were received at Department of Pathology, Government Medical College Kota from, from period of January 2018 to December 2019 [17-21]

Summary and conclusion

1. Eighty-seven cases of space occupying lesions (SOLs) of nasal cavity, PNS and nasopharynx were studied from the period of Jan 2018 to Dec 2019, were widely distributed over all age groups. Majority of cases occurred between the ages of 11-60 years. These lesions were more common in males. The male to female ratio was 1.43:1. Similar to other studies in literature.
2. Out of 87 cases, there were 85 cases of SOLs of nasal and paranasal. Among SOLs of nasal cavity and PNS, we encountered 68.23% non-neoplastic lesions and 31.76% neoplastic lesions. Out of these neoplastic lesions, 48.14.9% were benign and 51.85% were malignant. These percentages too were not variable and other studies in literature showed similar results.
3. Among non-neoplastic lesions, commonest lesion seen was inflammatory polyp constituting 79.31%. Among, SOLs of nasal cavity and PNS, commonest benign neoplasm encountered was hemangioma, comprising of 29.62% of all neoplastic lesions followed by inverted papilloma and 2 cases of SOLs of nasopharynx.
4. Among SOLs of nasal cavity and paranasal sinuses, we encountered 68.23% non-neoplastic lesions and 31.76% neoplastic lesions. Out of these neoplastic lesions, 48.14.9% were benign and 51.85% were malignant. These percentages too were not variable and other studies in literature showed similar results.
5. Among, SOLs of nasal cavity and paranasal sinuses, commonest benign neoplasm encountered was hemangioma, comprising of 29.62% of all neoplastic lesions followed by inverted papilloma which comprised of 11.11% of all neoplastic cases. This was variable in other studies found in the literature. Few studies showed hemangioma as the most common benign lesion of sinonasal region while in majority of studies, inverted papilloma presented as the most common benign lesion.
6. Commonest malignancies encountered were Squamous cell carcinoma and Adenocarcinoma. Both these malignant lesions comprised of 11.11% (each), of all neoplastic lesions. Other major

malignant lesions seen were Sinonasal undifferentiated carcinoma (3.70%), Adenoid cystic carcinoma (3.70%), Malignant melanoma (7.40%), PNET (3.70%), Plasmacytoma (3.70%), Basal cell carcinoma (3.70%), Non-Hodgkin's lymphoma (3.70%) of all neoplastic masses. Compared to other studies in literature, our study showed variation considerably. In all studies, Squamous cell carcinoma appears more than Adenocarcinoma of these regions, while in our study the percentage was found to be the same i.e. 11.11% of all neoplastic cases.

7. In our present study, Squamous cell carcinoma and Adenocarcinoma showed the same percentage which was a variation from other studies.

This may be a true calculation or it may vary because of a smaller sample size.

8. Other rarer tumors, in spite of a smaller sample size, showed a wide variation of well diagnosed cases of malignancies of nasal cavity and paranasal sinuses. This variation observed was very heartening. The variation was remarkably notable. It has been stated in literature, that all studies may show a wide variety of malignant cases with variable percentage. This extreme variability is a rarer finding in all studies of lesions of nasal cavity, PNS and nasopharynx.

9. Malignant lesions were seen in-between 35-90 years of age. Male to female ratio was 1.3:1, comparable to other studies.

10. In the present study, 2 cases of space occupying lesions of nasopharynx were received at Department of Pathology, Government Medical College Kota from, from period of January 2018 to December 2019. This study has been done with great concentration, and compared with other studies correctly. Variation found were few, the first being the difference between percentages of Squamous cell carcinoma and Adenocarcinoma explained earlier, the second prominent feature was commoner hemangioma in our study while inverted papilloma in others and lastly to our pleasure, we found a wide variety of rarer tumor in a smaller sample size.

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