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Original Research Article

Clinicopathological analysis of sinonasal lesions

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ABSTRACT

Introduction: The sinonasal tract is exposed to a variety of infections, chemical irritants, antigens and trauma giving rise to diverse inflammatory as well as neoplastic lesions.

Aim: The aim was to study the clinicopathological profile of lesions of nose and paranasal sinuses in this area of western Maharashtra.

Materials and Methods: The study included 59 biopsies/resection specimens received in the department during Jan 2015 to June 2019. Clinical and pathological details were analysed.

Results: There were 33 females and 26 males. Out of 59 cases, 46 were nonneoplastic and 13 neoplastic, with 10 benign and three malignant. The most common nonneoplastic lesion was sinonasal polyp (42 cases). Other nonneoplastic lesions included three cases of mucormycosis and one case of rhinosporidiosis. In the benign neoplasms, there were three cases of hemangiomas, two hamartomas, two inverted papillomas with one case each of hidradenoma, angiofibroma and schwannoma. We had three malignant tumors, one case each of, melanoma, poorly differentiated carcinoma and squamous cell carcinoma.

Conclusion: Nonneoplastic lesions were much more common than neoplastic ones in the sinonasal tract. Histopathological examination plays an important role in correct diagnosis and management.

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1. Introduction

The nasal cavity and paranasal sinuses are collectively referred to as sinonasal tract.¹ A variety of non- neoplastic and neoplastic conditions commonly involve the nasal cavity and paranasal sinuses.² A large number of diseases affecting these structures are due, in major part, to many of the specialized tissues, each with its own aberration that exists in this region.³

Clinical presentation of inflammatory as well as neoplastic lesions is similar and includes nasal discharge, epistaxis, nasal obstruction and disturbances of smell.⁴ Some lesions are specific to certain locations, for example angiofibromas and lymphoepitheliomas develop almost exclusively in the nasopharynx, lobular capillary

hemangiomas and Schneiderian papillomas involve the nasal cavity, intestinal type adenocarcinomas typically occur in the paranasal sinuses, and olfactory neuroblastomas arise from the superior portion of the nasal cavity.⁵

Clinically it is often difficult to distinguish between inflammatory and neoplastic lesions. Hence histopathological examination of all the lesions is mandatory for correct diagnosis.

2. Materials and Methods

The study included 59 biopsies/ resection specimens received in the Pathology Department, from 1st January 2015 to 30th June 2019. In case of nasal polyps, polypectomy specimens were received.

The biopsies and specimens were received in 10% formalin along with requisition form which included the

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clinical details.

The material was processed, paraffin blocks were made, five micron thick sections were cut and routinely stained with hematoxylin and eosin. The histopathological and clinical data from 59 cases was analyzed. The lesions were classified as infectious, nonneoplastic and neoplastic. Tumors of nasal cavity and paranasal sinus were classified according to WHO classification 2016.

3. Observations

In the present study, total 59 non-neoplastic and neoplastic lesions of nasal cavity and paranasal sinuses were included. All these cases were collected over a period of four and half year from 1st January 2015 to 30th June 2019. Total number of specimens received over this period was 11,906 out of which 59 specimens (0.4%) were of nose and paranasal sinuses. 46 out of 59 lesions were non-neoplastic and 13 were neoplastic. Out of 13 neoplastic cases, 10 were benign and three were malignant.

There were 33 females and 26 males in the study. 13 (22.0%) out of 59 cases were observed in the 4th decade.

In our study the most common symptom was nasal blockage (44 patients, 74.7%) variably accompanied by nasal discharge, epistaxis, and obstruction.

Table 1 shows the various histopathological lesions encountered in our study. The most common lesion was nasal polyp accounting for 42 cases (72.2%). Non-neoplastic lesions (77.9%) were more common than Neoplastic lesions (22.1%).

4. Discussion

The present study was done over a period of 4.5 years from January 2015 to June 2019 and included 59 lesions of nose and paranasal sinuses.

We had 26 males (42.6%) and 33 females (55.9%). Zafar et al. reported 93 males and 51 females while Swami et al. reported 58 males and 30 females in their study.^{6,7} Females were slightly more in number than males in our study. This could be due to the relatively small sample size of the study. Table 2 shows a comparison of our findings with other authors.

Sinonasal polyps were the most common lesion encountered in the nonneoplastic category. Other studies have also recorded the same finding.⁶⁻⁸ Polyps of the nasal cavity and paranasal sinuses are nonneoplastic stromal and epithelial proliferation of uncertain pathogenesis.³ Though they share morphologic similarities, there are two clinically and to a lesser extent, morphologically distinctive subtypes. Inflammatory polyps are nonneoplastic inflammatory swellings of sinonasal mucosa.⁹ Etiological factors are allergy, infections, cystic fibrosis, diabetes mellitus, aspirin intolerance etc. They mostly arise from lateral nasal wall or from ethmoid recess. Clinical

presentation is with nasal obstruction, headache and rhinorrhea. Antrochoanal polyps originate from wall of the maxillary antrum. They extend via long stalk through a large primary or accessory maxillary ostium into the nasal cavity.²

In present study the most common lesion was sinonasal polyp (42 cases, 72.2%) out of which 22 were inflammatory polyps and 20 were antrochoanal polyps. Macroscopically both the types were soft, fleshy, polypoid lesions with myxoid or mucoid appearance. Microscopy of inflammatory polyps showed polypoid mass lined by respiratory epithelium, thickened basement membrane, markedly edematous stroma surrounding mucinous glands. Stroma showed diffuse infiltration by eosinophils, plasma cells and lymphocytes (Figure 1). Microscopy of antrochoanal polyps showed features similar to sinonasal polyps except for lack of basement membrane thickening, mucous glands and eosinophils in the inflammatory infiltrate.

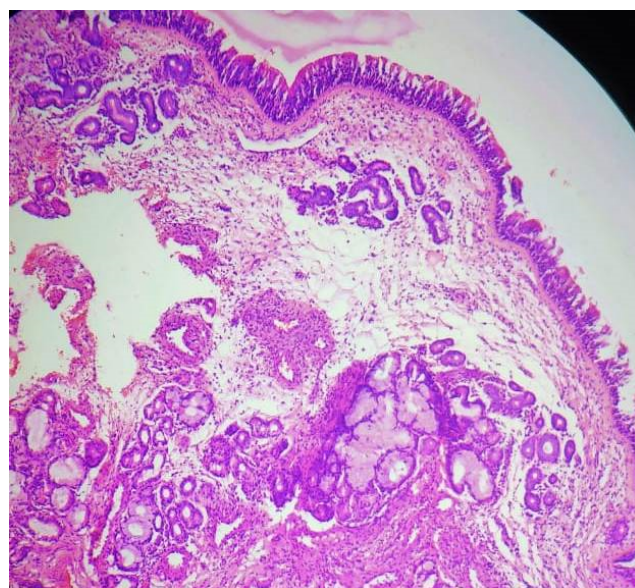


Fig. 1: Inflammatory polyp showing polypoid mass lined by respiratory epithelium, thickened basement membrane, markedly edematous stroma diffusely infiltrated by eosinophils, plasma cells and lymphocytes. (H&E 10x)

Zafar et al and Mane et al have also reported sinonasal polyp as the most common lesion in their study with prevalence of 95.9% (119 cases) and 96.5% (83 cases) respectively.^{6,8} Swami et al did not find any case of sinonasal polyp in their study.⁷

Mucormycosis (phycomycosis) is a life threatening opportunistic infection by organisms of the order Mucorales. Broad nonseptate hyphae, readily seen in hematoxyline and eosin (H and E) stained sections, spread along nerves, across tissue planes, and into blood vessels.²

In the present study, we found 3 cases (5.0%) of mucormycosis, two of the patients being diabetic.

Table 1: Various lesions encountered in our study

Histopathological diagnosis	Total	Percentage
Non-neoplastic cases		
1. Sinonasal polyps	42	72.2%
2. Mucormycosis	3	5.0%
3. Rhinosporidiosis	1	1.6%
Benign tumor		
1. Hemangioma (lobular capillary hemangioma) and (mixed capillary and cavernous type hemangioma)	3	5.0%
2. Hamartoma (REAH)	2	3.3%
3. Inverted papilloma	2	3.3%
4. Hidradenoma papilliferum	1	1.6%
5. Angiofibroma	1	1.6%
6. Schwannoma	1	1.6%
Malignant tumors		
1. Malignant melanoma	1	1.6%
2. Poorly differentiated carcinoma	1	1.6%
3. Squamous cell carcinoma	1	1.6%
Total	59	100%

Table 2: Showing the comparison of incidence of various non-neoplastic lesions in the present study with other authors

Histopathological lesions	Zafar et al ⁶	Mane et al ⁸	Swami et al ⁷	Present study
Total cases (Sample size)	144	126	88	59
1. Sinonasal polyps	119(95.9%)	83 (96.5%)	0	42(91.3%)
2. Mucormycosis	0	0	0	3(6.6%)
3. Rhinosporidiosis	5 (4.1%)	3 (3.5%)	1 (1.1%)	1 (2.1%)
Total	124(100%)	86(100%)	01(1.1%)	46 (100%)

Microscopically there were broad, nonseptate and branched hyphae morphologically consistent with mucormycosis. The background was necrotic. Zafar et al, Mane et al and Swami et al did not find any case of mucormycosis.^{6–8}

Rhinosporidiosis is a chronic infectious disease of upper respiratory tract characterized by formation of polypoid masses. It is caused by the sporulating organism *Rhinosporidium seeberi*.¹⁰ It most commonly involves nasal cavity (inferior turbinate along lateral nasal wall) and nasopharynx. Clinical presentation is nasal obstruction, epistaxis, rhinorrhea.

We had one case of Rhinosporidiosis in our study. Microscopically there were mucosal and submucosal cysts along with Sporangia containing innumerable sporangiospores. Zafar et al came across 5 (4.1%), Mane et al found 3 (3.5%) and Swami et al also found one (1.1%) case of rhinosporidiosis in their study.^{6–8}

Table 3 shows comparison of neoplastic lesions with other studies.

Hemangioma is a benign vascular lesion most commonly involving the anterior septum.¹⁰ Clinical features include epistaxis and obstruction.

In present study we found 3(4.9%) cases of hemangioma, two lobular capillary hemangiomas and one mixed capillary and cavernous hemangioma. Mane et al and Swami et al reported one case each of hemangioma in their study.^{7,8}

Sinonasal Respiratory Epithelial Adenomatoid Hamartoma (REAH) is a benign acquired overgrowth of indigenous glands of the sinonasal tract arising from the surface epithelium.¹¹ Clinical presentation of REAH and nasal polyps is similar. Also, both appear as pink fleshy masses on endoscopy. Hence histopathology is crucial for accurate diagnosis. A mistaken diagnosis of inverted papilloma or low grade sinonasal adenocarcinoma may lead to unnecessary or aggressive treatment.¹¹

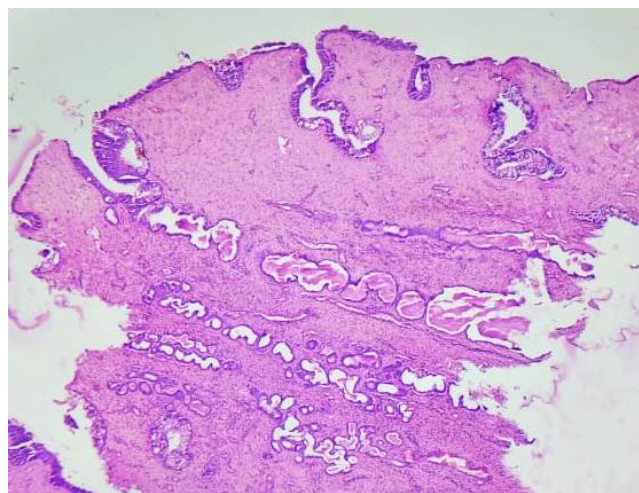
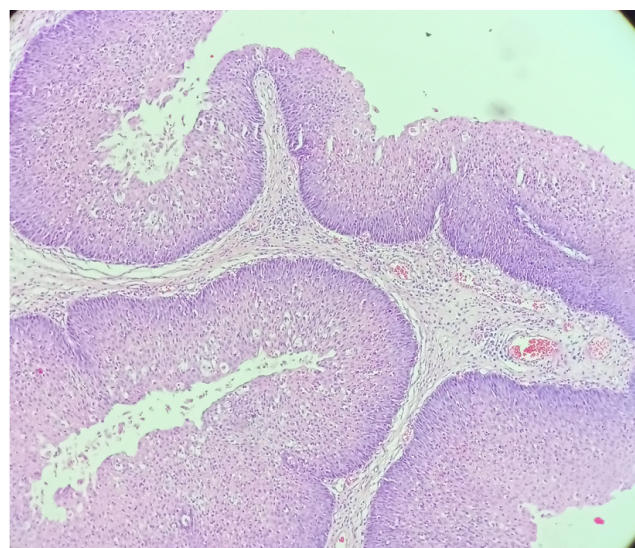
Microscopically REAH shows i) glandular proliferation ii) invagination of surface epithelium iii) oedematous stroma infiltrated by mononuclear cells and polymorphs and iv) thick hyalinized glandular basement membranes.

In present study we had two cases of REAH, one in a 36 years female and other in a 30 years male. Both presented with nasal discharge. In both the cases microscopy showed typical features of REAH (Figure 2). Zafar et al, Mane et al and Swami et al did not find any case of hamartoma in their study.^{6–8}

Sinonasal inverted papilloma is a surface lesion of the sinonasal tract that usually shows inverted growth and has multilayered epithelium with mucocytes and transmigrating neutrophils.¹⁰ In present study we had 2 cases (3.3%) of inverted papilloma. In both the cases, microscopy revealed endophytic (inverted) proliferation of stratified squamous epithelium. The stroma was edematous and

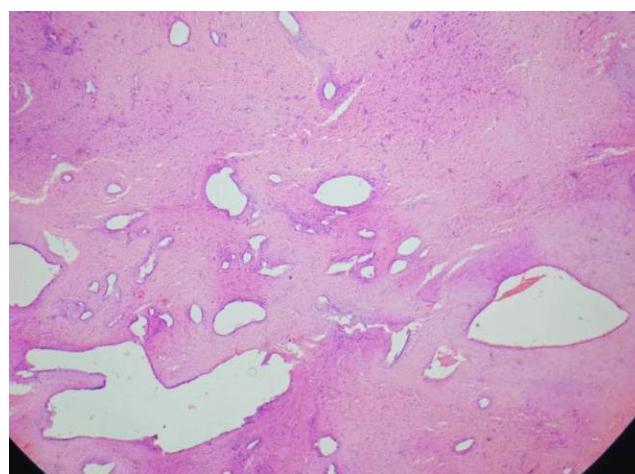
Table 3: Showing the comparison of various benign neoplastic lesions with other authors

Histopathological lesions	Zafar et al ⁶ (144)	Mane et al ⁸ (126)	Swami ⁷ (88)	Present study (59)
No of cases:				
Hemangioma (lobular capillary hemangioma) and (mixed capillary and cavernous type hemangioma)	0	1(9.0%)	1(11.1%)	3 (30.0%)
Hamartoma	0	0	0	2(20.0%)
Inverted papilloma	0	6 (54.5%)	5(55.5%)	2(20.0%)
Angiofibroma	0	4(36.5%)	3(33.4%)	1(10.0%)
Hidradenoma	0	0	0	1(10.0%)
Shwannoma	0	0	0	1(10.0%)
Total	00	11(100%)	09(100%)	10(100%)

**Fig. 2:** Respiratory epithelial adenomatoid hamartoma showing glandular proliferation with invaginations of surface epithelium. (H & E 10x)**Fig. 3:** Inverted papilloma showing endophytic proliferation of stratified squamous epithelium. (H & E 10x)

showed infiltration by mononuclear cells (Figure 3). Mane et al reported 6 (4.7%) cases and Swami et al reported 5 (5.6%) cases of inverted papilloma in their study while Zafar et al did not find any case in their study.^{6–8}

Nasopharyngeal angiofibroma is a benign but aggressive tumor of unknown etiology, typically occurring in adolescent males. Common presentation is with epistaxis and nasal obstruction.¹² We had one case of nasopharyngeal angiofibroma in a 16 years male presenting with nasal bleeding off and on and nasal obstruction. We received specimen of nasopharyngeal growth. Microscopy showed polypoidal tissue lined by respiratory epithelium. Core showed numerous variably sized and shaped endothelium lined blood vessels ranging from slit like small vessels to large staghorn channels. The stroma showed spindle, angular to plump cells with mild pleomorphism (Figure 4). Mane et al reported 4 (3.1%) cases, Swami et al reported 3 (3.4%) cases while Zafar et al did not find any case of angiofibroma in their study.^{6–8}

**Fig. 4:** Angiofibroma showing numerous variably sized and shaped endothelium lined blood vessels ranging from slit like small vessels to large staghorn channels. (H & E, x 10x)

Romero et al have studied 42 nasopharyngeal angiofibromas. They have reported Ki 67 positivity only in the endothelial cells lining the vessels, while stromal cells uniformly expressed factor XIIIa.¹³

Hidradenoma papilliferum is a rare benign neoplasm originating from the apocrine sweat glands. We had one case of hidradenoma and one case of schwannoma in our study. Zafar et al., Mane et al and Swami et al did not find any case of hidradenoma or schwannoma in their study.⁶⁻⁸

We had total three malignant tumors, one case each of malignant melanoma, undifferentiated carcinoma and squamous cell carcinoma. Mucosal melanoma is a neuroectodermal tumor originating from melanocytes.¹⁴ Sinusoidal mucosal malignant melanomas are rare tumors accounting for less than 1% of all malignant melanomas.¹⁵

Most typical macroscopic appearance is of a fleshy ulcerated polypoidal mass with pigmentation in 50-75% cases.¹³ In our case also it was a polypoid mass with blackish discoloration. Microscopy showed a tumor composed of round to polygonal to spindle shaped cells with pleomorphic vesicular nuclei, prominent inclusion like eosinophilic nucleoli and eosinophilic cytoplasm. Abundant intracytoplasmic melanin was noted (Figures 5 and 6).

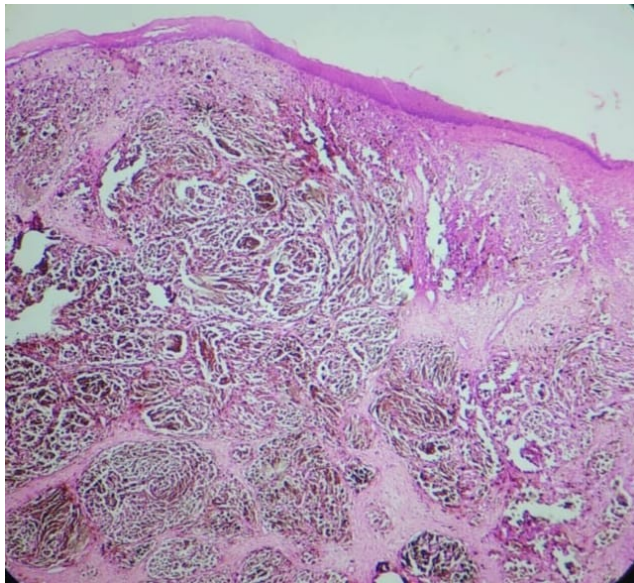


Fig. 5: Malignant melanoma showing tumor composed of oval to spindle cells containing abundant melanin pigment. (H &E 10x)

In a study of 42 cases of sinonasal mucosal malignant melanomas, Dreno et al reported nasal cavities as the predominant location particularly the septum and lateral wall. Amongst the histopathological prognostic factors, Thompson et al showed that increased melanin pigment was a highly predictive factor, amelanotic tumors having poorer prognosis.¹⁶ Swami et al reported one (1.1%) case while Zafar et al and Mane et al or did not come across any case of melanoma in their study.⁶⁻⁸

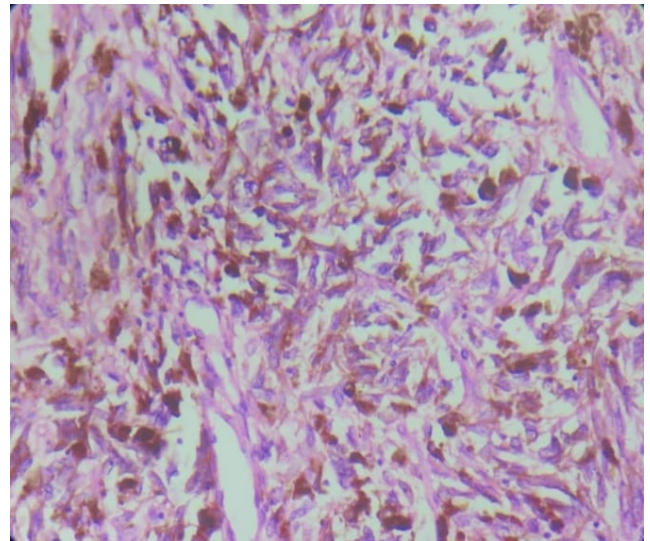


Fig. 6: Malignant melanoma (H&E 40x)

Sinonasal undifferentiated carcinoma is an undifferentiated carcinoma of the sinonasal tract without glandular or squamous features and is otherwise unclassifiable.¹⁷ In present study we found one case (1.6%) of undifferentiated carcinoma in a 70 years male. We received right nasal mass biopsy. Microscopy showed bits of tumor composed of round to oval cells having pleomorphic vesicular nuclei with prominent nucleoli and eosinophilic cytoplasm arranged in sheets and clusters. 0-2 mitotic figures per 10 high power field were noted. The intervening fibrocollagenous stroma showed infiltration by lymphocytes. The differential diagnosis of sinonasal undifferentiated carcinoma (SNUC) includes lymphoma, nonkeratinising squamous cell carcinoma, high grade neuroendocrine carcinoma, olfactory neuroblastoma, melanoma and NUT carcinoma. For confirmation of SNUC, IHC is mandatory. In our case the biopsy was tiny and there was no tissue left in the block for IHC. Hence the diagnosis could not be confirmed.^{7,18}

Zafar, Mane and Swami did not find any case of undifferentiated carcinoma in their study. We also found one case of Non keratinizing squamous cell carcinoma. Mane et al reported one (0.7%) case and Swami et al found two (2.2%) cases of squamous cell carcinoma in their study.^{7,8}

5. Conclusion

Non neoplastic lesions are more common than neoplastic lesions in nose and paranasal sinuses. Histopathological examination plays an important role in the diagnosis. Treatment strategies can be based on biopsy reports. Categorizing the sinonasal lesions according to histopathological features into various types also helps us to know the prevalence of these lesions.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare no conflict of interest.

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