Histopathological Study of Lesions of Nose and Paranasal Sinuses

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Abstract (1) To study the incidence of benign and malignant lesions of nose and paranasal sinuses (PNS). (2) To study various lesions in reference to sex differences and symptomatology. (3) To compare the findings of the study with other authors. The study was conducted over a period of 7 years both retrospectively and prospectively. The formalin fixed specimens were received with complete clinical and radiological features. Routine gross examination and required number of sections were taken and stained with hematoxylin and eosin. Periodic acid Schiffs and reticulin stains were used wherever necessary. The incidence of lesions in nasal cavity (NC) and PNS was 16.71 cases per year, non-neoplastic lesions constituted 86% of these cases and their incidence was 14.42% and neoplastic lesions constituted 12%. All the cases were carefully examined histopathologically and it was found that the region was affected by variety of lesions. Among 117 cases, 101 were non-neoplastic and 16 were neoplastic. The commonest site was NC, followed by PNS. They occur commonly in second and third decades with predominance in males. Amongst the non-inflammatory lesion, nasal polyp is the commonest lesion followed by rhinoscleroma and rhinosporidiosis. The common age group is second and third decades, with male predominance. Amongst benign neoplastic lesions capillary haemangioma was common followed by inverted papilloma.

The common age group is second and third decades, with male predominance. Malignant lesions were comparatively less to that of benign lesions.

Keywords Nose and paranasal sinuses · Rhinoscleroma · Rhinosporidiosis

Introduction

A variety of non-neoplastic and neoplastic conditions involve the nasal cavity (NC), paranasal sinuses (PNS) and these are very common lesions encountered in clinical practice. A large number of diseases affecting these structures are due, to many of the specialized tissues, each with its own aberrations that exist in the region [1]. The presenting features and *symptomatology* and advanced imaging technique help to reach a presumptive diagnosis but histopathological examination remains the mainstay of definitive diagnosis. Thus careful histological workup is essential for a correct diagnosis and timely intervention. The aim of this clinicopathological study was to find out the incidence of non-neoplastic and neoplastic lesions of NC and PNS, mode of *presentation* and histological types and to find out the great variety of non-neoplastic and neoplastic lesions of NC and PNS.

Materials and Methods

The study was conducted in the Department of Pathology at R.C.S.M. Government Medical College and CPR Hospital Kolhapur, over a period of 7 years both retrospectively and prospectively. The formalin fixed specimens were received with complete clinical and radiological features. Routine

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gross examination and required number of sections were taken and stained with hematoxylin and eosin. Periodic acid Schiffs and reticulin stains were used wherever necessary.

Observations

A total 117 cases presented as NC, PNS over a period of 7 years. Histopathological examination revealed that the non-neoplastic (101 cases) outnumbered neoplastic lesions (16 cases) in the ratio of 6.3:1.

Incidence

The incidence of lesions presenting as masses in NC, PNS was 16.71 cases per year. An overview is presented in Tables 1, 2, 3, 4 and 5.

Age

The age of presentation ranged from first to seventh decade of life. The mean age of presentation was 22.5 years. Thus, indicating that the majority of the patients were young adults.

Sex

The lesions of NC, PNS had a stronger predilection for males as compared to females with the male to female ratio being 2.16.

Site

NC was the predominant site of involvement with 105 cases and PNS with 12 cases.

Nasal polyp was the commonest lesion observed in this region. It constituted 69.3% (70 cases) of all non-neoplastic cases. The other non-neoplastic lesions in the decreasing order of frequency were rhinoscleroma (16 cases, 15.84%), rhinosporidiosis (14 cases, 13.86%), phaeohyphomycosis (1 case, 0.99%).

Table 2 Distribution of total nose and PNS biopsy cases

Non-neoplastic lesions	Neoplastic lesions	
101 cases (86%)	16 Cases (14%)	
	Benign	Malignant
	13 Cases (11.1%)	3 Cases (2.6%)

Nasal Polyp

It was the most common lesion involving this region. The age range was wide, the youngest patient was a 5 month old and the oldest was a 65 year old male, but peak was seen in second and third decade of life with male predominance. These polyps were typically bilateral in 60% cases and presented as mass in single nostril in the rest. The patients presented with symptoms of nasal stuffiness and obstruction and mass protruding from the nostril. On examination, the mass was glistening grape-like, insensitive to probing and did not bleed on touch. Microscopically, the polyps were composed of loose mucoid stroma and mucus glands, covered by respiratory epithelium. The stroma was infiltrated by lymphocytes, plasma cells, neutrophils and eosinophils.

Rhinoscleroma

It was the second most common non-neoplastic lesion in this region. The peak age of presentation was second and third decade with equal M:F ratio. The presenting features were obstruction of NC, foul smelling nasal discharge, and crusting. Microscopically, the predominant cells were foamy histocytes (Mikulicz cells) and plasma cells. Vasculitis, ulceration and pseudoepitheliomatous hyperplasia were also present.

Rhinosporidiosis

It was the third most common non-neoplastic lesion in this region. The peak age of presentation was in third decade with male predominance. The presenting features were nasal polypoidal mass, bleeding on touch. Microscopically,

Table 1 Year wise data of the nose and PNS biopsy cases

Sr. no.	Year	Total biopsy	Total nasal and paranasal biopsy	Non-neoplastic	Benign lesion	Malignant lesion
1	2003	915	11	11	–	–
2	2004	1,124	12	11	1	–
3	2005	992	27	25	2	–
4	2006	1,055	15	12	1	2 (SCC)
5	2007	882	12	8	4	–
6	2008	1,087	19	18	1	–
7	2009	1,287	21	16	4	1 (adenoid cystic ca)
Total		7,342	117	101	13	3

Table 3 Distribution of non-neoplastic lesions of nose and PNS

Sr. no.	Lesions	Number (% of cases)	Males	Females	M:F ratio	Nasal region	Para nasal sinuses	Age of presentation (decades)
1	Nasal polyp	70 (69.30)	50	20	2.4:1	59	11	2nd and 3rd
2	Rhinoscleroma	16 (15.84)	8	8	1:1	16	0	3rd
3	Rhinosporidiosis	14 (13.86)	11	3	3.6:1	14	0	3rd and 2nd
4	Fungal infection— phaeohyphomycosis	1 (0.99)	1	0	1:0	1	0	1st

Table 4 Distribution of benign neoplastic lesions of nose and PNS

Sr. no.	Lesions	No (% of cases)	Males	Females	M:F ratio	Nasal region	Para nasal sinuses	Age of presentation (decades)
1	Capillary haemangioma	5 (38.46)	2	3	0.66:1	5	0	All
2	Angiofibroma	4 (30.76)	4	0	4:1	4	0	2nd, 3rd, 4th
3	Inverted papilloma	2 (15.38)	—	2	0:2	2	0	4th
4	Basal cell adenoma	1 (7.69)	1	0	1:0	1	0	5th
5	Schwannoma	1 (7.69)	1	0	1:0	1	0	2nd

Table 5 Distribution of malignant neoplastic lesions of nose and PNS

Sr. no.	Lesions	No (% of cases)	Males	Females	M:F ratio	Nasal region	Para nasal sinuses	Age of presentation (decades)
1	Squamous cell carcinoma	2 (66.66)	1	1	1:1	2	0	7th and 6th
2	Adenoid cystic carcinoma	1 (33.33)	1	0	1:0	0	0	6th

there are numerous globular cysts representing thick walled sporangium containing numerous spores.

Phaeohyphomycosis

There was a case of disseminated cutaneous phaeohyphomycosis in a 6 year old immunocompetent child who initially presented with complaint of right sided nasal blockage. Nasal scrapping done, obstructing solid mass was removed and sent for histopathology.

Multiple sections were taken and stained with H&E. The sections showed multiple yeast-like cells and few septate hyphae, which were having brown coloured wall. Adjacent tissue showed granulomatous reaction with dense and diffuse chronic inflammatory infiltrate. PAS staining confirmed the presence of yeast like cells and septate hyphae which appeared bright magenta coloured.

Papilloma

Out of 13 benign tumors, 2 were inverted papilloma (15.38%), both cases were in fourth decade. All cases presented with nasal obstruction, discharge and nasal mass, arising from the lateral wall of the nose. Specimen received

Fig. 1 Microphotograph of inverted papilloma showing papillae growing downward in the deeper tissue (H&E ×400)

in the form of multiple polypoidal, firm and white bits. Microscopically these papillomas had inverted pattern of growth, they were composed of proliferating columnar epithelial cells with an admixture of mucin containing cells and numerous microcytes (Fig. 1).

Haemangioma

Five out of 13 benign epithelial tumours (38.46%) were capillary haemangiomas. This was seen in all age groups, male to female ratio was 0.66:1. All of them presented with nasal obstructions, epistaxis and nasal mass. Histologically all cases were capillary haemangioma.

Angiofibroma

Four out of 13 benign tumours (30.76%) were angiofibroma. Age varied from second to fourth decade. All were males and they presented with nasal mass. Histologically it is composed of intricate mixture of blood vessels and fibrous stroma. The stroma varies from loose and edematous with stellate fibroblasts and numerous mast cells, to acellular, and highly collagenized tissue. The vessels range from capillary size to venous size.

Schwannoma

Single case was reported in 21 years old male (7.69%). He presented with nasal mass with difficulty in breathing. Histopathological examination revealed classic features of schwannoma showing Antoni A and Antoni B areas with Verrocay bodies.

Basal Cell Adenoma

Single case was reported in 50 years old male, presented with nasal mass, histology showed typical palisading at the periphery of the epithelial nests, giving the tumor a basoid appearance.

Squamous Cell Carcinoma

Two cases were reported in a 65 years old male and 61 years old female respectively (66.6%). This was seen in the lateral wall as nasal mass. Microscopically, characteristic malignant squamous cells forming sheets and nests with occasional keratin pearls were seen.

Adenoid Cystic Carcinoma

Single case (33.3%) was reported in a 65 years old male. It presented with nasal obstruction and it showed a characteristic cribriform pattern.

Discussion

The incidence of sinonasal lesions was 16.71 cases per year, which represent only 1.5% of surgical pathology

material received in department. The incidence of non-neoplastic masses NC, PNS, and NP was 14.42 cases per year. This is consistent with the findings of Dasgupta et al. [2], who reported an incidence of 17.4 cases per year. However, the incidence reported by Tondon et al. [3] was 10 cases per year.

It is important to recognize the range of non-neoplastic lesions in this region and to differentiate them from neoplastic lesions because of different treatment modality and emotional burden on the patient. Among the polypoidal lesions, nasal polyp was the commonest. The incidence of nasal polyp in this study (69.3%) is similar to the observations by Tondon et al. [3] (64%) and Dasgupta et al. [2] (62.85%). The peak age of presentation, sex ratio, and clinical presentation were similar to that observed by these authors. Nasal polyps were bilateral in 60% of cases in our study while according to Bataskis [4] bilateralism was the rule.

The incidence of rhinoscleroma in our study (15.84%) was higher than that observed by Tondon et al. [3] (9% of all inflammatory lesions). In their study, a younger peak age of presentation was noted (20–29 years) which is similar to age presentation in our cases. Sex ratio of the cases was also similar to our cases.

Rhinosporidiosis is endemic in Asian countries [5]. Tondon et al. [3] reported the incidence of rhinosporidiosis as 24% in his study whereas in our study, it was 13.86% (Fig. 2).

Phaeohyphomycosis is an uncommon infection caused by heterogenous group of dematiaceous fungi which are characterised by the presence of darkly pigmented hyphae, pseudohyphae, yeast-like cells or combination of these forms. According to Sharma et al. [6], who have reviewed the literature on subcutaneous phaeohyphomycosis, 23

Fig. 2 Microphotograph of rhinosporidiosis showing mature and immature sporangia with surrounding inflammatory cells (H&E ×400)

Fig. 3 Microphotograph of schwannoma showing characteristic Verrocy bodies (H&E ×400)

patients were reported from India. Flanagan and Bryceson [7] reported a case of disseminated infection in a young immunocompetent man.

Among the benign tumours, epithelial tumours were less common when compared to non epithelial tumours and in epithelial tumours inverted papilloma was the commonest that is 15.38%. Narayana Swami and Chandre Gowda [8] also reported 13% incidence of inverted papilloma amongst all benign tumors.

Amongst non epithelial tumors capillary haemangioma (38.46%) was common, but Narayana Swami et al. reported 10% whereas, regarding angiofibroma there were 30.76% cases which is similar to 26.66% cases reported by Narayana Swami and Chandre Gowda [8].

Solitary nasal schwannomas are rare. Lesions presenting in the PNS and NC account for approximately 4% of head and neck schwannomas [9, 10]. In the study by Amee et al. [11], they found only 62 reported cases in the English-language literature from January 1943 through December 2006 (Fig. 3).

Sinonasal carcinomas are common neoplasms. There were 50% cases of squamous cell carcinoma [12]. Panchal et al. [13] reported 53% of squamous cell carcinoma amongst their malignant epithelial tumors.

Adenoid cystic carcinoma was reported in 50% cases. Panchal et al. [13] had the incidence of 17.8% of adenoid cystic carcinoma. In general, these are more frequent than the usual adenocarcinomas and are aggressive tumors, but with a better outcome as compared to similar tumors arising elsewhere in the head and neck region [14].

Conclusion

Amongst the non-inflammatory lesion, nasal polyp is the commonest lesion followed by rhinoscleroma and rhinosporidiosis. The common age group is second and third decades, with male predominance.

Amongst benign neoplastic lesions capillary haemangioma was common followed by inverted papilloma. The common age group is second and third decades, with male predominance.

Malignant lesions were comparatively less to that of benign lesions.

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