Sinonasal Mass—a Recent Study of Its Clinicopathological Profile

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Abstract A variety of non-neoplastic and neoplastic conditions involving the nasal cavity, paranasal sinuses (PNS), and nasopharynx are commonly encountered in clinical practice. The objectives of the study were to identify various pathological conditions that present with sinus or nasal mass, to understand their varied clinical behavior, to know the distribution of various lesions among the different age and sex groups, and to study the management of sinonasal masses and its outcome on follow-up. A prospective study was carried out from September 2013 to August 2015, in the Otorhinolaryngology Department of Hi-Tech Medical College & Hospital, Bhubaneswar, Odisha. The study included patients of any age and sex presenting with nasal symptoms (suspected of a sinonasal mass). This study included all cases seen during the above duration. Complete history was taken and full clinical examination was carried out. Majority of the patients with sinonasal masses were in the age group 41–50 years. Male:female ratio was about 1.2:1. Nasal obstruction was the most common presentation. Most common non-neoplastic lesion was rhinosporidiosis and most common benign lesion was hemangioma. Most common malignant lesion was maxillary carcinoma. The presenting features of all sinonasal lesions may be indistinguishable and pose

diagnostic dilemma. Correlation of clinical, radiologic, and most importantly pathologic modalities is of utmost importance for accurate diagnosis.

Keywords Sinonasal mass

Introduction

Mass in the nasal cavity, paranasal sinuses (PNS), and nasopharynx (NP) has inflicted man from time immemorial. The presenting symptomatology of all tumors is similar, and using advanced imaging, a presumptive diagnosis is often made. However, a careful histopathological examination is necessary to decide the nature of any particular lesion. A variety of non-neoplastic and neoplastic conditions involve the sinonasal cavity and nasopharynx, and these are very common lesions encountered in clinical practice [1].

The goal of clinicopathological study of sinonasal mass has evolved from removing all pathological masses to relieve the obstruction for restoring maximum possible function. The clinicopathological study also gives the valuable information about the possibility of changing a benign lesion into a malignant one.

Aims and Objectives

1. To identify various pathological conditions that present with sinus or nasal mass, and understand their varied clinical behaviors.
2. To know the distribution of various lesions among the different age and sex groups.
3. To study the management of sinonasal masses and its outcome on follow-up.

The study was undertaken to study the clinical as well as pathological aspect of sinonasal mass.

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Materials and Methods

A prospective study was carried out from September 2013 to August 2015, in the Department of Otorhinolaryngology, Hi-Tech Medical College & Hospital, at Bhubaneswar, Odisha. Only those patients presenting with sinonasal mass or symptoms of nasal blockage, epistaxis, or rhinorrhea were selected for this study. Previously operated cases were not included in the study. During the given time period, only 136 cases could be studied. A detailed history was taken and a thorough ENT and systemic examination followed. Along with these, other relevant and necessary investigations were carried out. Based on clinical signs and investigations, a diagnosis was made, and appropriate medical or surgical or both modalities of treatment were given.

Exclusion Criteria Previously treated cases of sinonasal disease with recurrence.

Observation and Results

This study included 136 cases of sinonasal masses. Various factors regarding clinical presentation, findings of various investigations, histopathological characteristics, and treatment were analyzed.

The most affected age group in our study was 41–50 years (29.4 %), and the least number of cases was seen in 0–10 years (2.9 %). The youngest patient was 8-year-old male child and the oldest patient was 72-year-old male. Male preponderance was more than female with ratio of 1.2:1 (Table 1). Nasal obstruction was the most common presentation (81.6 %), followed by nasal discharge (61.7 %), and then epistaxis (38.2 %). External nasal deformity (6.6 %) was the least common mode of presentation, followed by headache (13.9 %) (Table 2). Benign and malignant tumors were 28.7 and 11.7 %, respectively, in this study.

Non-neoplastic lesions were 59.6 % of total lesions and total neoplastic lesions were 40.4 % (Table 3). Of the 81 non-neoplastic cases, nasal polyps were the most common

Table 1 Age and sex distribution

Age group (in years)	Male	Female	Total	Percentage (%)
0–10	3	1	4	2.9
11–20	8	4	12	8.8
21–30	10	10	20	14.7
31–40	14	14	28	20.6
41–50	24	16	40	29.4
51–60	4	8	12	8.8
61 and above	11	9	20	14.7

Table 2 Clinical presentation

Mode of presentation	No. of cases	Percentage (%)
Nasal obstruction	111	81.6
Nasal discharge	84	61.7
Nasal mass	37	27.2
Epistaxis	52	38.2
Headache	19	13.9
Hyponasality	22	16.2
External nasal deformity	9	6.6

with 24.7 % of cases followed by rhinosporidiosis with 20.9 % of cases and nasal myiasis with 16.1 % of cases. Rhinolith and atrophic rhinitis were the least common non-neoplastic lesions with 2.5 and 3.7 % of cases, respectively. Male preponderance was the highest in fungal infection (M:F = 3:1) followed by nasal polyp (M:F = 1.8:1). Cases of atrophic rhinitis and rhinoscleroma occurred exclusively in females. Female preponderance was seen in nasal myiasis (M:F = 1:3.3) followed by nasolabial cysts and mucocele (M:F = 1:3). The highest average age of presentation was seen in nasal myiasis (48.8 years), mucocele (47.5 years), followed by fungal infection (46.5 years), and rhinoscleroma (45 years). The average age of presentation with adenoid hypertrophy was 7 years and rhinolith was 16 years.

Of the 39 benign cases, hemangioma was the most common with 17 (43.6 %) cases followed by inverted papilloma with 12 (30.7 %) cases. The least common was maxillary ameloblastoma with one (2.6 %) case followed by angiofibroma, squamous papilloma, and septal angioma each with three (7.7 %) cases. Angiofibroma and maxillary ameloblastoma presented exclusively in males. Male preponderance was seen in hemangioma (M:F = 2.4:1), inverted papilloma (M:F = 2:1), and septal angioma (M:F = 2:1). Female preponderance was seen in squamous papilloma (M:F = 1:2). The average age of presentation was the highest in hemangioma (46.2 years) followed by inverted papilloma (45.8 years). The average age of presentation for squamous papilloma and septal angioma was 38.3 years followed by maxillary ameloblastoma (38 years) and lastly by angiofibroma (18.3 years).

Of the 16 malignant cases, carcinoma of maxillary sinus accounted for 7 (43.75 %) cases followed by nasopharyngeal carcinoma with 4 (25 %) cases. The least common cases were

Table 3 Distribution of each type of lesion

Type of lesion	No. of cases	Percentage (%)
Non-neoplastic	81	59.6
Benign tumor	39	28.7
Malignant tumor	16	11.7

solitary plasmacytoma with only one (6.25 %) case. Nasopharyngeal carcinoma and solitary plasmacytoma presented exclusively in male patients. Male preponderance was seen in maxillary carcinoma (M:F = 1.3:1). Equal male and female presentation was seen in malignant melanoma and carcinoma of nasal cavity (Table 4). Different modalities of treatments were used for different lesions. The age of presentation was 55 years for carcinoma of nasal cavity, 50 years for malignant melanoma, and 48 years for solitary plasmacytoma. Squamous cell carcinoma forms 66 % of malignant cases. The most common mode of treatment was only surgery (48.5 %) followed by cases given medical along with surgical treatment (23.5 %). Only medical line of treatment was given to 17.6 % of cases. Most malignant sinonasal masses underwent radiotherapy along with surgery (8.1 %) (Table 5).

Discussion

In the present study, the highest incidence of sinonasal mass was found in the age group of 41–50 years (29.4 %). This is in concordance with a study by Aminu Bakari et al. [2] in which the majority of the patients with sinonasal masses were in the age group 21–50 years. The observed male:female ratio was

Table 4 Distribution of cases according to type of lesion, sex ratio, and average age of presentation

Diagnosis	No. of cases	Percentage (%)	M:F	Average age of presentation (in years)
Non-neoplastic (81 cases)				
Adenoid hypertrophy	5	6.2	3:2	7
Rhinosporidosis	17	20.9	1.4:1	35.6
Nasal polyp	20	24.7	1.8:1	36.5
Nasolabial cyst	4	4.9	1:3	35
Rhinolith	2	2.5	1:1	20
Atrophic rhinitis	3	3.7	F only	31.7
Fungal infection	8	9.9	3:1	46.5
Nasal myiasis	13	16.1	1:3.3	48.8
Rhinoscleroma	5	6.2	F only	45
Mucocele	4	4.9	1:3	47.5
Benign lesions (39 cases)				
Angiofibroma	3	7.7	M only	18.3
Inverted papilloma	12	30.7	2:1	45.8
Hemangioma	17	43.6	2.4:1	46.2
Squamous papilloma	3	7.7	1:2	38.3
Maxillary ameloblastoma	1	2.6	M only	38
Septal angioma	3	7.7	2:1	38.3
Malignant lesions (16 cases)				
Nasopharyngeal carcinoma	4	25	M only	40
Maxillary carcinoma	7	43.75	1.3:1	43.6
Malignant melanoma	2	12.5	1:1	50
Carcinoma nasal cavity	2	12.5	1:1	55
Solitary plasmacytoma	1	6.25	M only	48

1.2:1, which was almost similar to study done by U. Zafar et al. [3] (1.7:1). In this study, the most presentation was nasal blockage presentation (81.6 %), followed by nasal discharge (61.7 %), and then epistaxis (38.2 %). External nasal deformity (6.6 %) was the least common mode of presentation, followed by headache (13.9 %). Similar observation was done by Narayan Swamy et al. [4] and found that nasal obstruction (76.66 %) was the most common presentation, and epistaxis (53 %) and nasal discharge (50 %) were the commonest symptoms. The main presenting symptoms as per Aminu Bakari et al. [2] were nasal blockage (97.4 %), rhinorrhea (94.7 %), allergic symptoms (52.6 %), and anosmia (34.6 %). S.S. Bist et al. [5] stated that the most common presenting symptoms were nasal obstruction (87.27 %), nasal discharge (69.09 %), and headache (60.9 %). Benign and malignant tumors were 28.7 and 11.7 %, respectively, in this study. The incidence of non-neoplastic lesions was in corroboration with a study by N. Khan et al. [6] and S.S. Bist et al. [5] (60 %) and Jyothi A Raj et al. [7] (67.21 %). It was not in agreement with the following studies for incidence of non-neoplastic lesions: 74.61 % in a study by Tondon et al. [8] and 74.04 % in a study by Janice Jaison et al. [9].

In this study, out of the 81 non-neoplastic cases, nasal polyps were the most common with 24.7 % of cases with 1.8:1 male:female ratio followed by rhinosporidosis with 20.9 % of cases and nasal myiasis with 16.1 % of cases, which was discordant with the study done by N. Khan et al. [6] where nasal polyps comprised 83.33 % of cases (M:F = 2:1) followed by 5.55 % of rhinoscleroma cases, among the non-neoplastic lesions. The peak age of presentation for rhinoscleroma was 40 years, which was similar to our study. This age group was in comparison with the studies of Badraway et al. [10] where the rhinoscleroma patients were in the 3rd and 4th decade of life. According to Tondon et al. [8] 47 % of lesions of nasal cavity were polyps, and as per Anjali et al. [11] 62.8 % were polyps, which was much higher as compared to those in our study. Amreliwala et al. [12] stated the sex ratio for nasal myiasis was 1:1.3 with average age in the 5th decade, which was similar to our study. In our study of the 39 benign cases, hemangioma was the most common with 43.6 % of cases followed by inverted papilloma with 30.7 % of cases. In a study by N. Khan et al. [6] of the 56 cases of benign tumors, angiofibroma was 42.85 % followed by inverted papilloma (26.78 %). The male:female ratio of inverted papilloma was 3:1, which was similar to our study. A. Lathi et al. [13] stated that the presence of 47.3 % of cases of hemangioma and 36.8 % of cases of inverted papilloma, which was similar to our study.

Of the 16 malignant cases, carcinoma of maxillary sinus accounted for 43.75 % of cases followed by nasopharyngeal carcinoma with 25 % of cases. In a study by N. Khan et al. [6], NPC comprise of 25 % of cases with M:F = 3:2. Malignant melanoma formed 10 % of malignant cases with sex ratio of

Table 5 Modalities of treatment

TYPE	MED		MED + SUR		SUR		RT		SUR + RT		CT		REC	PLDF
Non-neoplastic	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	3	0
	21	15.4	32	23.5	28	20.6	0	—	0	—	0	—		
Benign	3	2.2	0	—	35	25.7	0	—	0	—	0	—	2	3
Malignant	0	—	0	—	3	2.2	2	1.5	11	8.1	1	0.7	1	1
Total	24	17.6	32	23.5	66	48.5	2	1.5	11	8.1	1	0.7	6	4

1:1, which was similar to our study. In a study by Janice et al. [9], squamous cell carcinoma of the maxillary sinus was the commonest malignant lesion. As per Abu Hena et al. [14], among the malignant tumors of nasal cavity, squamous cell carcinoma was most frequent (41.67 %) with average age 51 years. As per Jyothi et al. [7], squamous cell carcinoma was the most common type of malignancy, and maxillary antrum was the most common site. For nasopharyngeal carcinoma, average age was 51.6 years, which was almost similar to study, done by Richard T. Hoppe et al. [15].

Different modalities of treatments were used for different lesions. Only medical line of treatment was given to rhinoscleroma, nasal myiasis, and atrophic rhinitis. For a case of solitary plasmacytoma, chemotherapy was given. Malignant melanoma was treated with radiotherapy. For most cases of malignancies, post-operative radiotherapy was given. Three cases of recurrence were seen in rhinosporidiosis, two cases of recurrences were seen in inverted papilloma, and one case of recurrence in a case of maxillary carcinoma. Four patients were lost in follow-up. One patient of rhinoscleroma was treated medically with combination of rifampicin (450 mg od) and ciprofloxacin (500 mg bd) for 6 weeks. Pre-op renal function was assessed and side effects were explained to the patient. Other patients were treated surgically along with medical treatment. Surgical debridement of the mass followed by recanalization was done using polythene tube. Tube was removed after 6 weeks. No recurrence was seen after 6 months. Nasoalveolar cyst was excised via sub labial approach. All cases of inverted papilloma were excised by either conservative resection or by lateral rhinotomy approach. Conservative resection was done endoscopically for less extensive lesions. All cases of angiofibroma were excised by lateral rhinotomy approach. Hemangiomas were excised and electrocauterized from its base.

For maxillary sinus malignancy, lateral rhinotomy combined with total maxillectomy was done. In a study by Aminu Bakari et al. [2], 72.4 % of cases underwent surgical excision while 9.2 % had medical treatment with nasal topical steroid spray. About 17.1 % of cases were lost to follow-up. As per the study conducted by A. Lathi et al. [13], surgery was major mode of treatment in all cases. Harshad et al. [16] stated that most non-neoplastic and benign neoplastic nasal masses

require surgical excision, while malignant neoplastic nasal masses require wide surgical excision, radiotherapy, or chemotherapy either alone or in combination.

Conclusion

The masses in nasal cavity, paranasal sinuses, and nasopharynx encompass a wide spectrum of common and rare diseases and are very common lesions encountered in clinical practice. The proximity of organ of special senses, the proximity of the brain, makes the treatment program most debilitating, and bizarre pattern of symptoms causes delayed diagnosis. Indeed, the average period of time from the initial presentation of symptoms to the time of a definitive diagnosis is almost 6 months. Thorough history, endoscopic examination and advanced imaging technique help to reach a presumptive diagnosis but histopathological examination remains the mainstay of final definitive diagnosis.

In the present study, the most affected age group was 41–50 years, which does not correlate with most studies (A. Lathi et al. [13]—the 2nd to 4th decade, and Shaila N. Shah et al. [17]—the 3rd decade (27 %) followed by the 2nd decade (20 %) of life). The fifth decade (41–50 years) was the most common age group for non-neoplastic lesions in the current study. But as per Aloke Bose Majumdar et al. [19], non-neoplastic nasal masses were the commonest in the 2nd to 4th decade of life, and according to J. Bhattacharya et al. [18], majority of non-neoplastic masses occurred in the age group 11–30 years. U. Zafar et al. [3] stated that in their study most non-neoplastic lesion age of presentation was observed in the 3rd decade of life. The difference from our study might be due to higher incidence of allergic rhinitis in this region.

The most affected age group for benign diseases in our study was 41–50 years (5th decade) with 17 (43.6 %) cases out of a total of 39 benign cases. Our findings were not comparable with Janice et al. [9], where benign tumors of nasal cavity, paranasal sinuses, and nasopharynx showed a peak incidence in the 1st and 2nd decade of life.

In this study, the sex ratio for non-neoplastic tumors is 1:1.1 and that for benign tumors is 1.8:1. The male:female ratio for non-neoplastic lesions was 1.7:1 in a study by Harshad et al.

[16] and 1.2:1 by Janice et al. [9]. M:F was 1.15:1 by Aloke Bose et al. [19]. The male:female ratio for benign lesions was 3:1 in a study by N. Khan et al. [6] and 2.6:1 in a study by Harshad et al. [16]. The overall male:female ratio was similar to 1.2:1 by Bakari et al. [2] and dissimilar with 3.5:1 in a study by Abu Hena et al. [14], 3:1 by Dafale et al. [20], and 1.7:1 by U. Zafar et al. [3].

In a study by N. Khan et al. [6], nasal polyps comprised of 83.33 % of cases (M:F = 2: 1) followed by 5.55 % of rhinoscleroma cases, among the non-neoplastic lesions, which was discordant from our study. According to Tondon et al. [8], 47 % of lesions of nasal cavity were polyps, and as per Anjali et al. [11], 62.8 % were polyps, which is much higher as compared to those in our study.

In the present study of masses in sinonasal cavity and nasopharynx, most of the time, patients present with trivial nasal symptoms, and there is always a possibility to miss the diagnosis if great care is not taken while examining the patient. The findings must be interpreted in light of great clinical suspicion and complete ENT examination including radiologic and endoscopic studies. Clinical diagnosis is often difficult and has to be relied on histopathological examination of biopsy specimen and may require repeated biopsies. Management of these patients is challenging due to varied presentations and lack of a definite protocol.

Timely diagnosis and early medical treatment will decrease the burden of morbidity and mortality in these patients. Some time-combined modalities of treatment should be used for effective treatment. Awareness regarding the disease process and health education should be provided to people regarding smoking, maintenance of hygienic conditions, avoid public pond bathing, and utilization of health facilities. Emergence of newer surgical, medical, and radiological interventions has opened up a new chapter while dealing with these patients.

References

1. Stammberger H, Lund VJ. Anatomy of the nose and paranasal sinuses. In: Michael Gleeson edited. Scott-Brown's otorhinolaryngology, head neck surgery: 7th edition London: Hodder Arnold, 2008, vol. 2; chapter 104: 1315–1344
2. Bakari A, Afolabi OA, Adoga AA, Kodiya AM, Ahmad BM (2010) Clinico-pathological profile of sinonasal masses: an experience in national ear care centre Kaduna, Nigeria. BMC Research Notes 3:186
3. Zafar U, Khan N, Afroz N, Hasan SA (2008) Clinicopathological neoplastic lesions of nasal cavity and paranasal sinuses. Ind J of Pathology and Microbiology 51(1):26–29
4. Narayanaswamy KV, Chandre Gowda BV (2004) Oct- Dec A clinical study of the benign tumors of nose and paranasal sinuses. Ind J of Otolaryngol and Head and Neck Surgery 56(4):265–268
5. Bist SS, Varshney S, Baunthiyal V, Bhagat S, Kusum A (2012) Jul-Dec Clinico-pathological profile of sinonasal masses: an experience in tertiary care hospital of Uttarakhand. National Journal of Maxillofacial Surgery 3(2):180–186
6. Khan N, Zafar U, Afroz N, Ahmad SS, Hasan SA (2006) July-Sept Masses of nasal cavity, paranasal sinuses and nasopharynx: a clinicopathological study. Indian Journal of Otolaryngology and Head and Neck Surgery 58(3):259–263
7. Raj JA, Sharmila PS, Shrivastava M, Mahantachar V, Rajaram T (2013) Morphological spectrum of lesions in the sinonasal region. J Evol Med Dent Sci 2(37):7175–7186
8. Tondon PL, Gulati J, Mehta N (1971) Histological study of polypoidal lesions in the nasal cavity. Indian Journal of Otolaryngology and head and neck surgery 23(1):3–11
9. Jaison J, Tekwani DT (2015) Histopathological lesions of nasal cavity, paranasal sinuses and nasopharynx. Annals of applied Biosciences 2(2):A40–A45
10. Badraway R, El Shennawy M (1974) Affection of cervical lymph nodes in rhinoscleroma. J Laryng Otol, March 88(3):261–269
11. Anjali DG, Ghosh RN, Chhanda M (1997) Nasal polyps—histopathologic spectrum. Indian Journal Otolaryngology and head and neck surgery 49:32–36
12. Amreliwala MS, Jain SKT, Raizada RM, Chaturvedi VN (1996) Jan-Mar Nasal myiasis. Indian Journal of Otolaryngology and head and neck surgery 48(1):25–28
13. Lathi A, Syed MMA, Kalakoti P, Qutub D, Kishve SP (2011) Clinico-pathological profile of sinonasal masses: a study from a tertiary care hospital of India. Acta Otorhinolaryngol Ital 31:372–377
14. Humayun AHMP, Zahurul Huq AHM, Tarequddin Ahmed SM, Kamal MS, Kyaw Khin U, Bhattacharjee N (2010) Clinicopathological study of sinonasal masses. Bangladesh Journal of Otorhinolaryngology 16(1):15–22
15. Richard TH, Don RG, Malcom AB (1976) Carcinoma of the nasopharynx: 18 years experience with megavoltage radiation therapy. Cancer 37:2605–2612
16. Sutar HB (2015) Clinicopathological study of nasal polypoidal masses. Annals of International Medical and Dental research 1(3): 315–319
17. Shaila N.Shah, Yatish Goswami. Study of lesions of nasal cavity, nasopharynx and paranasal sinuses by histopathological examination. Gujrat Medical Journal, 2012 August; 67(2):70–72
18. Bhattacharya J, Goswami BK, Banerjee A, Bhattacharya R, Chakrabarti I, Giri A et al (2015) The Egyptian Journal of Otolaryngology 31(2):98–104
19. Majumdar AB, Sarker G, Biswas D, Dey S, Prasad A, Pal-Kishanganj (Bihar) R (2014) Clinicopathological study of sinonasal masses. National Journal of Otorhinolaryngology and Head and neck surgery 2(11):19–22
20. Dafale SR, Yenni VV, Bannur HB, Malur PR, Hundgund BR, Patil SY (2012) Histopathological study of polypoidal lesions of the nasal cavity—a cross-sectional study. Al Ameen J Med Sci 5(4): 403–406