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Original Research Article

Clinico-pathological study of sinonasal masses at a tertiary care hospital of southern Bihar

Garima Singh[1]*, Ankita Sinha[1], Ranbir K. Pandey[1], Deepak K. Gupta[1], Shashank Saurabh[2], Kumar Sanu[3]

[1]Department of Otorhinolaryngology, Narayan Medical College and Hospital, Jamuhar, Bihar, India
[2]Department of Otorhinolaryngology, Lal Hospital and Research Centre, Ranchi, Jharkhand, India
[3]Department of Otorhinolaryngology, Madhubani Medical College and Hospital, Bihar, India

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***Correspondence:**
Dr. Garima Singh,
E-mail: garima.astor@gmail.com

ABSTRACT

Background: This study focuses on sino-nasal masses (SNMs) and their presentation with their radiological findings and corroboration with initial diagnosis and histopathological examination (HPE).
Methods: A prospective study conducted in total 62 patients with SNMs presenting between the period (September 2020 to October 2022) in medical college, southern Bihar. Patients were subjected to detailed history and battery of tests with all necessary investigations. Final diagnosis was concluded after HPE.
Results: Age distribution ranged from 10 to 64 years with mean age of 34.2 and M: F ratio of 1.14:1. Demography suggested predisposition in low socioeconomic strata (N=36; 58.06%). Majority fell in category of farmers (N=16; 25.8%) followed by housewives, laborers. Majority presented within a time frame of 1-2 years of onset of symptoms/appearance of the lesion (N=25;40.3%) followed by 6 months to 1-year. Most common presenting symptom was nasal obstruction (N=59;95.16%), followed by nasal discharge (n= 49, 79.03%). HPE concluded 45 samples (72.58%) as non-neoplastic, 15 samples (24.19%) as benign neoplastic (96.7%) and 2 as malignant neoplastic lesions (3.22%). In 58 out of 62 patients (93.54%) the clinical diagnosis was corroborated with HPE diagnosis.
Conclusions: Nasal polyps, the most common benign lesions and SCCs, the most common malignant lesion of SNT. Malignant lesions common in elderlies should be differentiated from non-malignant lesions. Due to similar presentation of diversified aetiology, a clinical and radiological evaluation is of prime for initial management. HPE remains the gold standard for final diagnosis and definitive management.

Keywords: Sinonasal masses, Sinonasal tract radiology, Histopathological examination

INTRODUCTION

As easy as the nasal masses may appear, diagnosing them is a daunting task, the reason being the similarity in their appearance and clinical presentations for a diversity of pathology.

A sino-nasal mass (SNM) is an abnormal growth found in the sinonasal tract radiology (SNT), which can present at any age of life as a unilateral or bilateral lesion. Anatomically, SNT is in close proximity to vital structures such as the orbit, base of skull and oropharynx which makes it a complex lesion and therefore necessitates the need for accurate diagnosis and prompt management. SNM poses substantial diagnostic dilemma for the pathologists as the anatomy is complex and difficulty in processing specimens. A great deal of effort ensures preservation of relationship between the structures. Secondly the tumors arising in this location demonstrates an overlapping histologic feature despite a divergent

pathogenesis and/or tissues of origin. The pathologist should equate the differential diagnosis as the treatment protocol vary depending on the characteristic of the lesion.

The prevalence of SNM is 1-4% in general population.[1] SNM's can be broadly categorized as Non-neoplastic and Neoplastic. They are further categorized as congenital, inflammatory, granulomatous, traumatic or Neoplastic (benign or malignant).

Amongst all the SNM's nasal polyps are frequently encountered with an incidence of 2-3% in general population.[2] The polypoidal SNM's reports various nasal symptoms like obstruction, epistaxis, blood-stained nasal discharge, rhinorrhoea, sneezing, and smell disorders, orbital symptoms like epiphora, proptosis, swelling, diminution of vision and aural symptoms like earache, discharge, hearing loss along with snoring, apnoeic spells, cranial neuropathy and deformity.[3]

The recent advanced modalities like diagnostic nasal endoscopy, computed tomography (CT) scan, magnetic resonance imaging (MRI) and cytology have been helpful in providing a detailed understanding of the nature and course of the disease process and implementation of correct, specific and timely intervention. This study aims to revisit clinical profile, diagnostic modalities and the role of clinical, radiological, and histopathological modalities in diagnosis and management of sino-nasal masses.

METHODS

Ours' is a single centred observational prospective study that was conducted in ENT department of Narayan Medical College and Hospital in southern region of Bihar at a tertiary care centre over a period of 2 years (September 2020 to October 2022). The sample size was concluded in all patients with sinonasal masses fulfilling the inclusion/exclusion criteria coming to ENT OPD in the given time frame of (September 2020 to October 2022). Frequency and percentage were calculated and tabulated, data analysis was done using statistical package for the social sciences (SPSS) software (16.0). Patients above the age of 5 years presenting with sinonasal tract masses undergoing surgical excision, and willing to participate in the study were included. Patients with age less than 5 years, those presenting with masses encroaching SNT from adjoining area, with unclear history and those having history of chemotherapy and/or radiotherapy, and not willing to participate in the study were excluded. A detailed history was taken and after the thorough clinical examination (examination of nasal cavity, oral cavity, throat, and neck), all the patients were subjected to rhinoscopy, diagnostic nasal endoscopy (DNE) and radiological evaluation (X-ray PNS, CT PNS, MRI PNS) to aid the clinical diagnosis. The radiological evaluation confirmed the site of origin and extent of the lesions along with an assessment of the mass, the lining mucosa, the paranasal cavity, soft tissue involvement and any bony involvement. Ethical approval was obtained from Institutional Ethical Committee IEC No: IEC/2021/59.

RESULTS

This study was conducted for the period of 23 months, in which a total number of 62 patients presenting with sinonasal masses were observed.

The age distribution of the patients ranged from 10 to 64 years with a mean age of 34.2 years. The highest incidence of occurrence (N=24; 38.7%) was found in the age group of 30 to 40 years.

The overall sex distribution showed a male preponderance over the female (M: F ratio 1.14:1).

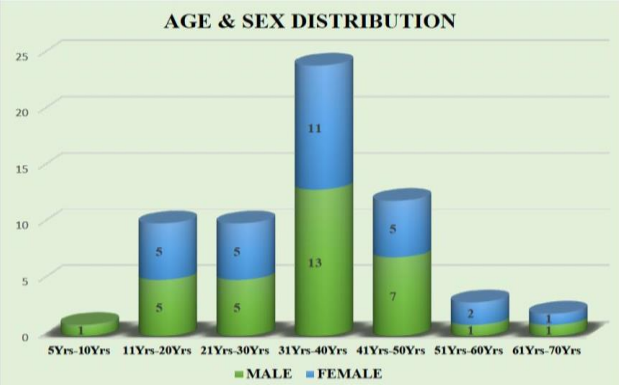

Figure 1: Distribution of the patients according to age and sex.

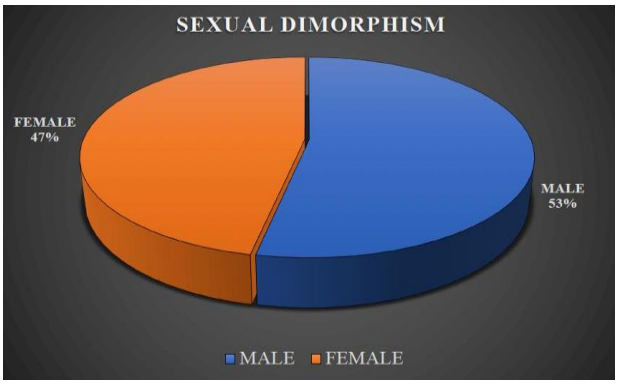

Figure 2: Gender wise distribution.

The demography of the cohort suggested a predisposition in low socioeconomic strata (N=36; 58.06%). By occupation, most of the patients fell in the category of farmers (N=16; 25.8%) followed by housewives (N=13; 20.9%), laborers (N=12; 19.3%) and students (N=10; 16.1%).

Majority of patients presented to the outpatient department within a time frame of 1-2 years of onset of symptoms or appearance of the lesion (N=25; 40.3%) followed by 6 months to 1-year (N=21;33.8%).

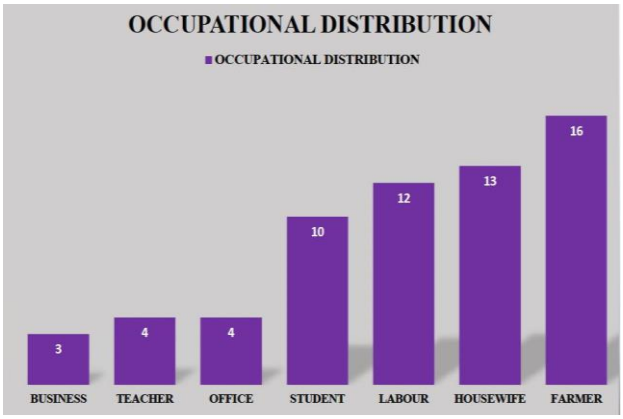

Figure 3: Occupational distribution.

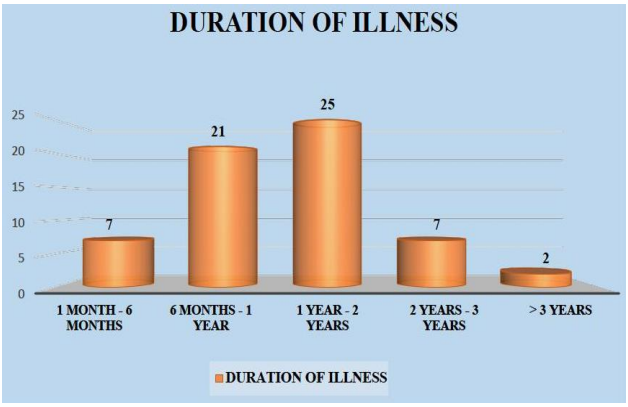

Figure 4: Duration of illness.

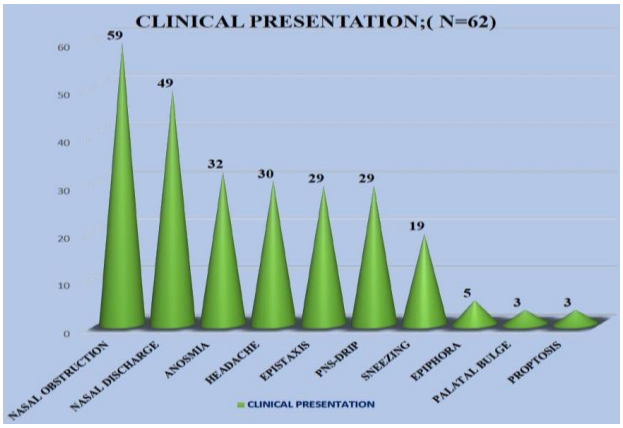

Figure 5: Common presenting symptoms.

In this study group, 17 patients had a history of bidi smoking (27.4%) with an average of 20 pack years. The most common presenting symptom in the study population was nasal obstruction observed in a total number of 59 patients (95.16%), followed by nasal discharge (n=49, 79.03%), anosmia (n= 32, 51.6%), epistaxis (n=29, 46.7%), postnasal drip (n=29, 46.7%), sneezing (n=19, 30.6%). Nasal discharge was mostly mucoid or mucopurulent in nature with few patients having watery discharge. A string test was performed in all the patients with watery discharge to rule out the cerebrospinal fluid. Most patients with epistaxis had history of trauma caused by nose-picking. Patients with nasopharyngeal angiofibroma (N=5) and capillary hemangioma (N=3) had spontaneous epistaxis. Two patients with suspected malignancy had intermittent epistaxis. Postnasal drip, sneezing and anosmia were commonly associated with sinusitis and polypoidal growth. Anterior rhinoscopy was able to locate the mass in 49 patients (79.03%) whereas in 58 (93.54%) patients the mass was visible in DNE. In the rest of the 4 patients, mass was confined to paranasal sinuses and hence could only be located with CT-PNS. Morphologically polypoidal mass was seen in 46 patients (74.19%) whereas fleshy mass was seen in 12 patients (19.3%). Oropharyngeal mass appearing as a polypoidal growth was present in 2 patients (3.22%) and a fleshy globular was seen in 1 patient (1.61%). A visible mass in posterior rhinoscopy was seen in 4 patients (6.4%).

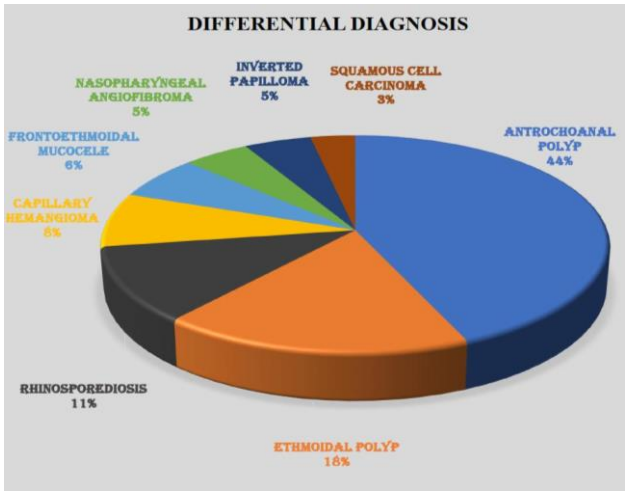

Figure 6: Final diagnosis of SNMs.

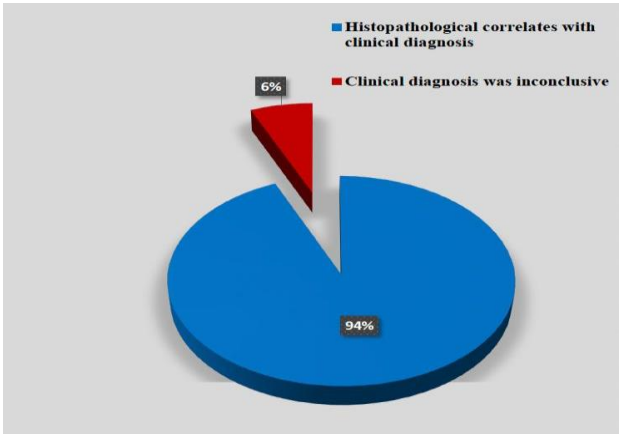

Figure 7: Accuracy of diagnosis with radiology and HPE.

All patients underwent diagnostic nasal endoscopy (DNE) and 93.54% were found to have visible masses during the examination which helped in determining the site of origin. The most common site of origin of polypoidal mass was the middle meatus (N=30; 48.38%), followed by the

lateral wall of the nasal cavity (N=16; 25.8%) and superior meatus (N=4;6.45%) whereas fleshy masses were mostly originating from the nasal septum (N=12; 19.35%). Mucoid discharge was found to be common in non-neoplastic nasal polypoid masses. All the patients with malignant neoplastic polypoid masses presented with blood-stained discharge or recurrent epistaxis. Ocular involvement was seen in 3 patients (4.8%) and a palatal bulge was seen in 3 patients as well (4.8%) mostly with neoplastic masses and inverted papilloma. Radiological investigations were done on a total number of 52 patients (83.87%) as few of them could not afford the cost of imaging and a few didn't require the imaging. Out of 47 patients who underwent CT-PNS, CECT was done in 21 patients (33.8%) and NCCT in 26 patients (41.9%) and MRI in 5 patients (8.06%). All the patients underwent surgical excision of mass under general anesthesia through various approaches (endoscopic, lateral rhinotomy, medial maxillectomy, transeptal excision, trans-nasal and Caldwell-Luc). Histopathological examination was carried out in all 62 excised specimens. Out of which 45 samples (72.58%) were non-neoplastic, 15 samples (24.19%) were neoplastic but benign (96.7%) and 2 were found to be malignant neoplastic lesions (3.22%). In 58 out of 62 patients (93.54%) the clinical diagnosis was corroborated with the HP diagnosis. However, the final diagnosis was changed in 4 patients (6.46%) based on HP examination. The accuracy of diagnosis with clinical and radiological method was 94% (N=58).

Table 1: Distribution of SNM according to HPE

Type of disease on histopathology	Frequency (n)	Percentage (n)
Non-neoplastic (N=45; 72.58%)		
Inflammatory (N=38; 61.29%)		
Antrochoanal polyp	27	43.54
Ethmoidal polyp	11	17.74
Granulomatous (N=7; 11.29%)		
Rhinosporidiosis	7	11.29
Neoplastic (N=17; 27.41%)		
Benign (N=15; 24.19%)		
Inverted papilloma	3	4.83
Capillary haemangiomas	5	8.06
Nasopharyngeal angiofibroma	3	4.83
Frontoethmoidal Mucocele	4	6.45
Malignant (N=2; 3.22%)		
Squamous cell carcinoma	2	3.22
Total	62	100

Table 2: Co-relation of radiological finding, radiology, HPE.

Clinical diagnosis	N	Radiological diagnosis	N	Histopathological diagnosis	N
Antrochoanal polyp	27	Antrochoanal polyp	27	Antrochoanal Polyp	27
Nasal polyp	1	Antrochoanal polyp	1	Inverted Papilloma	1
Ethmoidal polyp	10	Ethmoidal polyp	10	Ethmoidal Polyp	10
Sinonasal polyposis/ allergic fungal sinusitis	1	Ethmoidal cystic lesion	1	Mucocele	1
Rhinosporidiosis	7	Rhinosporidiosis	7	Rhinosporidiosis	7
Rhinosporidiosis	1	Nasal polyp	1	Lobar capillary hemangioma	1
Inverted papilloma	1	Inverted papilloma	1	Inverted papilloma	1
Malignant lesion	1	Inverted papilloma	1	Inverted papilloma	1
Hemangioma	4	Lobulated hemangioma	4	Lobular capillary hemangioma	4
Nasopharyngeal angiofibroma	2	Nasopharyngeal Angiofibroma	2	Nasopharyngeal angiofibroma	2
Sini nasal mass	1	Angiomatous polyp	1	Nasopharyngeal angiofibroma	1
Frontal mucocele	3	Frontoethmoidal cystic lesion	3	Frontoethmoidal mucocele	3
Malignant mass	2	Malignant mass	2	Squamous cell carcinoma	2
Total	62	Total	62	Total	62

DISCUSSION

Sinonasal mass is a common presentation in the outpatient department. They have similar presenting symptoms but with a diverse list of differential diagnoses. Therefore, it demands a thorough clinical evaluation aided by imaging and tissue diagnosis for accurate management. Our study was conducted in a tertiary centre in southern Bihar, India. A total of 62 patients with sinonasal mass were included. Out of which majority were non-neoplastic which was in concordance with a study conducted by Prakash et al.[4] However, in another study conducted by Dasgupta et al reported an equal prevalence of non-neoplastic and neoplastic lesions.[5] The mean age of presentation in our study was 34.2 years which goes in the line with earlier studies conducted by Bist et al the mean age of presentation was 39.4 years.[6] Bakari et al reported a peak incidence of 33 years, while for Zafar et al the mean age of presentation was 22.5 years.[7,8] The 2nd to 4th decades of life is the most vulnerable period for the development of sinonasal masses. Malignancies have been reported

generally after the fourth decade of life. In our analysis 3rd decade was the most commonly affected age group (38.7%). Lathi et al reported a similar incidence of prevalence in 3rd decade of life.[9] In contrast, studies conducted by Agarwal et al and Deosthale et al showed the highest incidence of sinonasal masses in the age group of 41-50 years.[10,11] In the present study, the demographic trend showed male preponderance over female (1.14: 1) which is in concordance with a study conducted by Deosthale et al which showed a slight preponderance of males to females (1.08:1) and Rokade et al with males: female ratio of 1.6:1.[11,12] The ratio was higher (M:F ratio of 1.7:1) in the study by Zafar et al from India, while a study from Nigeria revealed an opposite ratio showing female preponderance (M:F ratio of 1:1.2).[7,8] A British review of nasal polyposis reported a ratio of 2:1 (M: F). A study conducted by Hasan et al suggested that the predilection for males over females was because of predisposing factors such as smoking habits, dust exposure, more infection and outdoor work prevalent in males in comparison to females.[13] We studied different occupational exposures among the study population and we surprisingly found that agricultural workers were the most vulnerable group amongst all (25.8%) followed by housewives (20.96%) and manual labour (19.35%). 1 female patient with squamous cell carcinoma had a 30 years history of firewood cooking and 1 male patient with SCC was a chronic smoker for 45 years. Alabi et al conducted research on sinonasal malignancy in a Nigerian tertiary hospital over 6 years where they similarly found a largest group (29%) was exposed to indoor cooking and wood dust most likely in the form of firewood for cooking.[14] In addition, cigarette smoking (18%) was found to be an important risk factor in their study which is similar to our results. The overall pathological distribution of sinonasal masses in our study group was non-neoplastic i.e., 45 patients (72.58%) and neoplastic i.e., 17 patients (27.41%). Out of the neoplastic population 15 (24.19%) had benign lesions and 2 (3.22%) had a malignant lesion. Diamantopoulos et al in their study on 2021 patients revealed that 1830 (90.5%) patients were non-neoplastic and the remaining 181 (8.9%) were of neoplastic origin.[15] In the non-neoplastic cases, 1570 polyps (77.6% of the total) were of allergic, inflammatory or infective origin. Of the 181 neoplastic cases, 98 (4.8% of the total) were benign while 83 (4.1% of the total) were with malignant pathology. According to the literature, nasal polyps are the most common tumours of the sino-nasal tract and they result from chronic inflammation of the mucous membrane of the nasal cavity and paranasal sinuses. The exact pathogenesis is unknown however, a strong association of allergy, infection, asthma and aspirin sensitivity has been implicated and probably this is the reason why in our study most of the cases of polyps were seen in farmers (25.8%).[9,12] The polypoidal lesion was the most commonly diagnosed non-neoplastic lesion in our study population and it was similarly documented by other studies too. True nasal polyps were mostly allergic and inflammatory polyps. Allergic polyps showed abundant eosinophils in the stroma in addition to inflammatory cells. Ethmoidal polyps and antrochoanal polyps are generally allergic and inflammatory in nature respectively.[9] This trend was also seen considering the two forms of polyps in the present study. We found 96.77% of the sinonasal masses to be non-malignant. A such high percentage of non-neoplastic sino nasal masses have been reported by many studies like Gupta et al and Thakur et al.[16,17] In our study, most of the cases were unilateral lesions (N=46; 74.19%). The bilateral nasal polyp were mostly ethmoidal polyps. Most of the neoplastic polyps were unilateral in our study population. According to Maheshwari et al study, the majority of the Sino-nasal masses were unilateral (56.25%).[18] Similar was the finding observed by Bakri et al (55.3%) and Bist et al (74.55%).[6,7] In contrast, Lathi et al reported a high incidence of bilateral sino-nasal mass (51.8%) as also by Zafar et al (60%).[8,9] This difference might be due to the geographical variation of the disease. Rhinosporidiosis is a chronic granulomatous disease caused by Rhinosporidium seeberi. Although a variety of sites may be affected, the principal site is nasal mucosa; the disease is endemic to India and Sri Lanka. In our study, we found 7 cases of rhinosporidiosis (11.29%) out of which 6 were male (85.7%) and 1 female (14.2%) which is similar to the study reported by Bhattacharya et al.[19] A higher incidence of rhinosporidiosis in the present study can be attributed to poor hygiene and the practice of pond bathing in this topographical region of southern Bihar. Nasopharyngeal angiofibroma is restricted to the young aged male population. In our study, we found 3 cases of nasopharyngeal angiofibroma and all of them were males. This was consistent with the findings of Bhattacharya et al.[19] Juvenile angiofibroma forms 0.5% of all head and neck tumours in Europe.[21] In our study benign neoplastic lesions were seen in 15 patients (24.19%) out of which capillary haemangioma (8.06%) was most common followed by mucocele (6.45), inverted papilloma and nasopharyngeal angiofibroma 4.83% each. The main presenting complaint of majority of the study population was a nasal obstruction in 59 patients (95.16%) which was followed by nasal discharge in 49 patients (79.03%). Similar presenting features were also found in study reported by Deosthale et al.[11] Intermittent epistaxis and facial deformity were a feature of malignant masses.[20] Inverted papilloma is comparatively rare, but this morphological variant is the most commonly encountered lesion of all sinonasal papillomas.[22] The other two morphological forms are exophytic (everted) squamous cell papilloma and cylindrical cell papilloma. In this study, we found 3 cases of inverted papilloma (4.83%). 2 patients who were clinically diagnosed as a nasal polyp and malignant polyp respectively were histologically proven to be inverted papilloma. Inverted papilloma was associated with squamous cell carcinoma of the sinonasal cavity in 6 (21.4%) of the 28 cases studied by Califano et al in the USA.[23] According to the literature, malignancy of the sino nasal tract is rare.[24] The incidence of sinonasal malignancy is approximately 3.5 per 100000 populations/year. The maxillary sinus is the most common site for the origin of a malignant lesion.[25] Squamous cell carcinoma is the most common histological type of neoplasm and is rarely

encountered before 4th decade of life. In our study 2 patients (3.22%) had neoplastic lesions histologically diagnosed as squamous cell carcinoma of the maxillary sinus. Both the patients were in the elderly age group between 61-70 years. Pradhananga et al reported 6.3% of their sinonasal masses to be malignant, while for Fasunla et al malignant sinonasal tumours constituted 59.4% of the 138 sinonasal neoplasms seen.[25,26] Svane-Knudsen et al have similarly reported squamous cell carcinoma to be the most commonly encountered malignancy of the sinonasal tract in Denmark.[27] A Polish study by Zyłka et al reported 71-80 years to be the most commonly affected age group for malignancies of the sinonasal tract. Male: female ratio of malignancy in our study was 1:1. This was probably due to the small cohort. More duration and sample size are needed to establish it. Malignant tumours were treated with wide excision followed by chemo-radiotherapy. Both of our patients had maxillary SCC which was treated with lateral rhinotomy and total maxillectomy followed by chemo-radiotherapy. In our study, 5 patients out of 47 who underwent CT imaging had a difference in clinical and radiological diagnosis. Several studies have provided evidence that CT and symptoms do not necessarily correlate. In a study by Bolger et al, 42% of asymptomatic patients had mucosal changes on CT scan.[28] In a study, Stankiewicz examined 78 patients meeting chronic rhinosinusitis symptom criteria of which only 47% had evidence of chronic rhinosinusitis on CT.[29] In the current study of 62 patients, 58 patients (93.54%) had a clinical and radiological diagnosis correlating with histopathology whereas in 4 patients (6.45%) the final diagnosis was modified after obtaining the tissue diagnosis. In a study conducted by Lathi et al surgery was the major modality of treatment in all sinonasal masses.[9] Sutar et al stated that most non-neoplastic and benign neoplastic nasal masses require surgical excision, while malignant neoplastic lesions require wide surgical excision, followed by radiotherapy, or chemotherapy either alone or in combination.[3] Our modality of management is at par with their findings.

Our study had the following limitations, it was a small sample size confined to a limited geographical location, therefore the data cannot be extrapolated on a larger demography. Most of the patients with malignant masses were either lost to management or follow-up.

CONCLUSION

The study concluded that the sinonasal masses can result from a wide variety of pathological entities ranging from inflammatory, granulomatous and neoplastic origin. Nasal polyps are the most common benign lesions and squamous cell carcinoma is the most common malignant lesion of SNT. Malignant lesions are generally observed in the elderly and should be differentiated from non-malignant lesions. Due to a similar presentation of a diversified aetiology, a clinical and radiological evaluation is of prime importance for initial management but histopathology remains the gold standard for final diagnosis and definitive management.

Recommendations

This clinicopathological study of Sino nasal mass helps to diagnose the diseases of SNT at the early stage of their presentation hence, delivering an effective management to restore the maximum possible function.

As easy as the nasal masses appear, diagnosing them is a challenging task, the reason being the similarity in their appearance and clinical presentations for a diversity of pathologies. It can also present as a considerable diagnostic dilemma for the pathologist due to overlapping histologic feature.

The study recommends a combination of clinical, radiological and histopathological modalities for diagnosis of each and every mass of SNT irrespective of age, gender or time of presentation.

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