

Clinicopathological Study of Sinonasal Masses

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ABSTRACT

Background: Sinonasal mass is a common finding in the Otorhinolaryngology Department. These can be non-neoplastic or neoplastic. Nasal obstruction is the most common clinical presentation. Imaging studies are not always conclusive in these cases. So, the present study aimed at clinical presentation and histopathological classification of sinonasal masses.

Methods: All the specimens received as sinonasal masses were included in the present study. The tissues were routinely processed for histopathological examination and were stained by Hematoxylin and Eosin stain. Special stains were used wherever required. Immunohistochemistry was carried on cases with diagnostic difficulties.

Results: Non-neoplastic lesions outnumbered the neoplastic lesions. Among the neoplastic lesions, benign tumours were more common than malignant tumours. Non-neoplastic lesions and benign tumours were commonly seen in middle age group while malignant tumours were seen in adult patients. Males were predominantly affected in non-neoplastic lesions and benign tumours. Malignant tumours showed female dominance. Nasal obstruction was the most common complaint. Overall, inflammatory nasal polyps were most common lesions. Inverted papillomas were most common benign tumours. Sinonasal undifferentiated carcinomas accounted for majority of malignant tumours.

Conclusion: Sino-nasal masses or polyps can be non-neoplastic or neoplastic lesions and histopathological examination remains the mainstay in differentiating these lesions.

Keywords: Nasal Cavity, Paranasal Sinus, Polyp, Nasal Obstruction.

Introduction

The nasal cavity and paranasal sinuses are collectively referred as sinonasal tract. Sinonasal area is exposed to various infective agents, chemicals, antigens, mechanical and many other influences. These deleterious exposures lead to formation of tumour like and neoplastic conditions.^[1] Most of these lesions in Otorhinolaryngology Department present as polypoid masses, making it difficult to distinguish non-neoplastic polyps from polypoid neoplasms clinically.^[2] Inflammatory polyps are a common cause of nasal obstruction, with a prevalence of 4% in the general population.^[3] Benign tumours are relatively common, but malignant neoplasms are rare. Malignant tumours account for 0.2% to 0.8% of total malignancies and only 3% of all malignant tumours of upper aerodigestive tract.^[4] Nasal obstruction is the most common symptom. Other symptoms include nasal discharge, epistaxis and disturbances of smell.^[5] Fine needle aspiration of paranasal sinus lesions is difficult due to closed architecture, and only one study has been documented in the literature.^[6] Intraoperative cytology and frozen section examinations of lesions of nose and paranasal sinuses are useful, quick, and reliable diagnostic technique for rapid and early diagnosis in the operation theatre and can be used as an adjunct to histopathology for better management of patients.^[7]

The presenting features, symptomatology and advanced imaging technique help to reach a presumptive diagnosis but histopathological examination remains the mainstay of final definitive diagnosis.^[8,9]

The present study was carried to study the age and sex distribution of sinonasal masses, their clinical presentation and to categorize them histopathologically.

Materials and Methods

The present study was three year retrospective and two year prospective, carried out in the Department of Pathology, Grant Govt. Medical College & Sir J. J. Group of Hospital, Mumbai.

All the specimens received as sinonasal mass were included in the present study. Lesions of the nasopharyngeal region and lesions arising from the external nose were not included in the study. The tissues were routinely processed for histopathological examination and were stained by Hematoxylin and Eosin stain. Special stains were used wherever required. The clinical details and imaging studies were obtained from medical record section. Detailed microscopic study was done and then the final diagnosis was given. Typing of the neoplastic lesions was carried out following WHO classification. Immunohistochemistry was carried on cases with diagnostic difficulties.

Approval for the study was given by the Institutional Ethical Committee.

Result

Out of 36,829 specimens received during 5 year study period, 135 specimens (0.36%) involved lesions of nose and paranasal sinuses. Repeat biopsies were received in 4 cases. In 5 cases opinion was not possible due to inadequate biopsy or necrotic tissue, so these cases were excluded from the study. Thus, final study included total 126 cases.

Non-neoplastic lesions (83.33%) outnumbered the neoplastic lesions (16.67%). Among the neoplastic lesions, benign tumours (11.9%) were more common than malignant tumours (4.76%) (Table 1). Youngest patient affected was 19 years and oldest was 77 years. Non-neoplastic lesions and benign tumours were commonly seen in 3rd-5th decade while malignant tumours were seen in adult patient in 6th and 7th decade (Table 2). Males were predominantly

affected in non-neoplastic lesions and benign tumours. Malignant tumours showed female dominance (Table 3). Nasal obstruction was the most common complaint in all non-neoplastic and neoplastic lesions. Epistaxis was also common presentation in neoplastic lesions (Table 4).

Overall, inflammatory nasal polyps were most common lesions (69.04%). These were further sub-classified as edematous or eosinophilic polyp (68.96%), fibro-inflammatory polyp (21.83%) and polyp with seromucinous gland hyperplasia (9.19%). Fungal rhinosinusitis and rhinosporidiosis were other non-neoplastic lesions. Non-invasive fungal rhinosinusitis was seen in 60% cases and invasive fungal rhinosinusitis in 40% cases. Fungal ball was most common presentation (40%). Inverted papillomas were most common benign tumours followed by angiofibroma. Sinonasal undifferentiated carcinomas constituted 66.66% of malignant tumours.

Table 1: Distribution of lesions.

Histopathological diagnosis	No. of cases	Percentage (%)
I. Non-neoplastic lesions	105	83.33
Inflammatory nasal polyp	87	69.04
Fungal rhinosinusitis	15	11.90
Rhinosporidiosis	3	2.38
II. Benign tumours	15	11.90
Inverted papilloma	6	4.76
Angiofibroma	4	3.17
Solitary fibrous tumour	1	0.79
Lobular capillary hemangioma	1	0.79
Osteoid osteoma	1	0.79
Ossifying fibroma	1	0.79
Giant cell reparative granuloma	1	0.79
III) Malignant tumours	6	4.76
Squamous cell carcinoma	1	0.79
Sino-nasal undifferentiated carcinoma	4	3.17
Neuroendocrinoma	1	0.79
Total	126	100

Table 2: Age wise distribution of lesions.

Age in years	Non-neoplastic lesions (%)	Benign tumours(%)	Malignant tumours(%)
1-10	0	0	0
11-20	7.6	20	0
21-30	30.5	13.3	16.67
31-40	25.7	26.7	0
41-50	22.9	20	0
51-60	7.6	6.7	50.0
61-70	3.8	13.3	33.33
71-80	1.9	00	0
Total	100	100	100

Table 3: Gender wise distribution of lesions

Sex	Non-neoplastic lesions (%)	Benign tumours(%)	Malignant tumours(%)
Male	57.1	80	33.33
Female	42.9	20	66.67

Table 4: Clinical features

Clinical features	Non-neoplastic lesions (%)	Benign tumours(%)	Malignant tumours(%)
Nasal obstruction	84.76	80	71.4
Nasal discharge	55.23	53.3	42.8
Headache	18.09	6.7	28.6
Epistaxis	22.85	53.3	71.4
Anosmia/ Hyposmia	37.14	13.3	28.6
Breathlessness	11.42	0	0
Facial swelling	0.95	6.7	42.8
Eye related symptoms	4.76	0	28.6

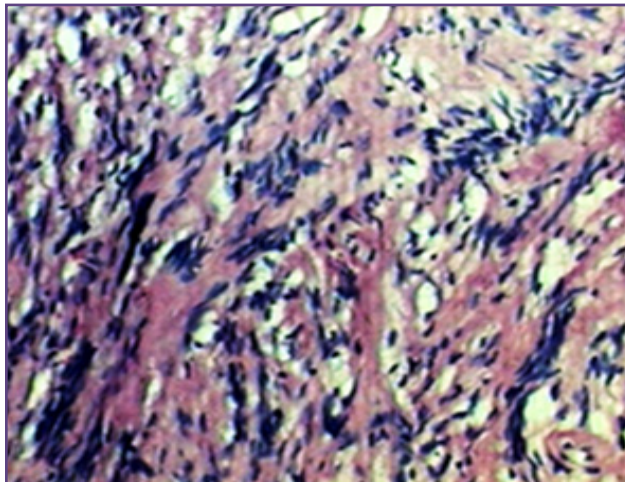


Fig. 1a: Solitary fibrous tumor showing spindle cells arranged in fascicles with indistinct cytoplasmic margins and plump to spindle nuclei (H&E, X400).

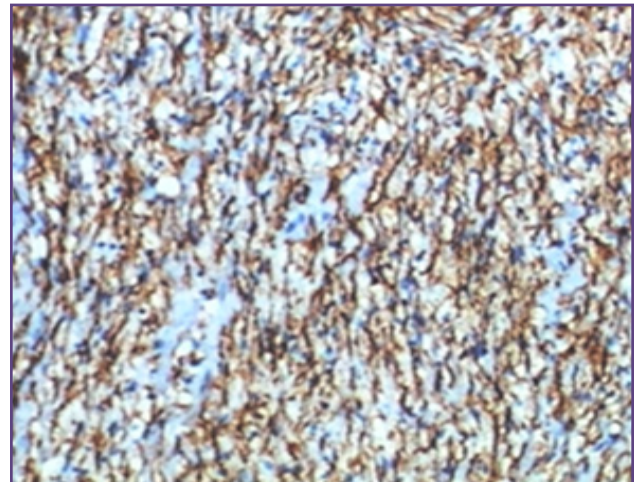


Fig. 1b: Solitary fibrous tumor showing diffuse cytoplasmic positivity for CD34.

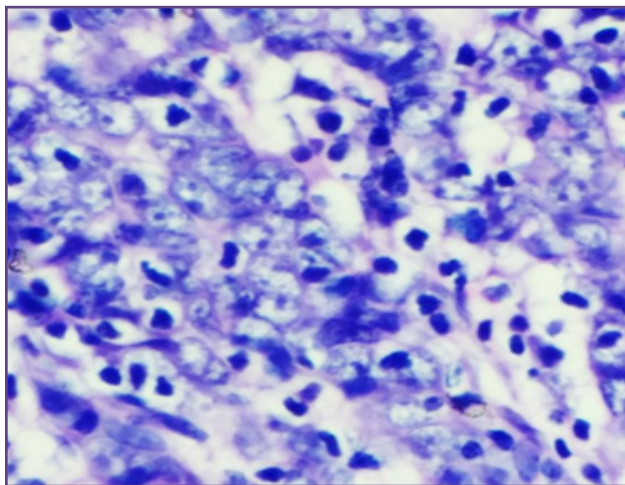


Fig 2a: Sinonasal undifferentiated carcinoma showing large tumor cells with scant cytoplasm, vesicular nuclei and prominent nucleoli (H&E, X400).

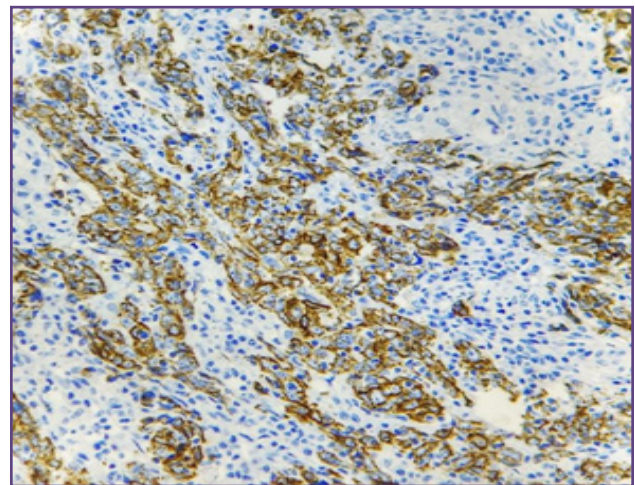


Fig. 2b: Sinonasal undifferentiated carcinoma showing strong pan-cytokeratin positivity.



Fig. 3a: Neuroendocrine tumor, multiple fragmented, grayish white to tan tissue bits.

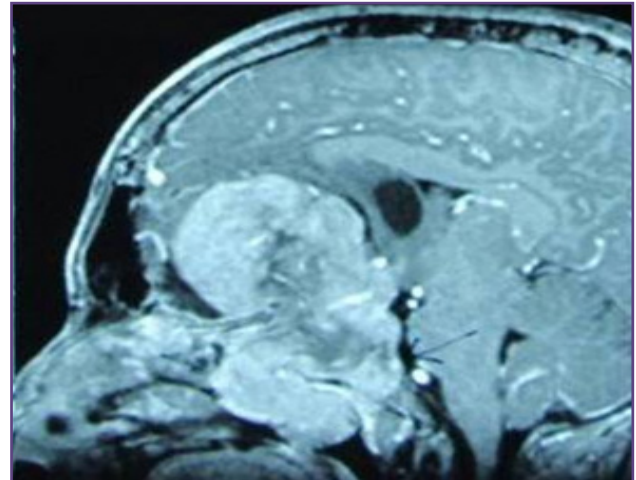


Fig. 3b: Neuroendocrine tumor, MRI showing tumour in sphenoid and ethmoidal sinus.

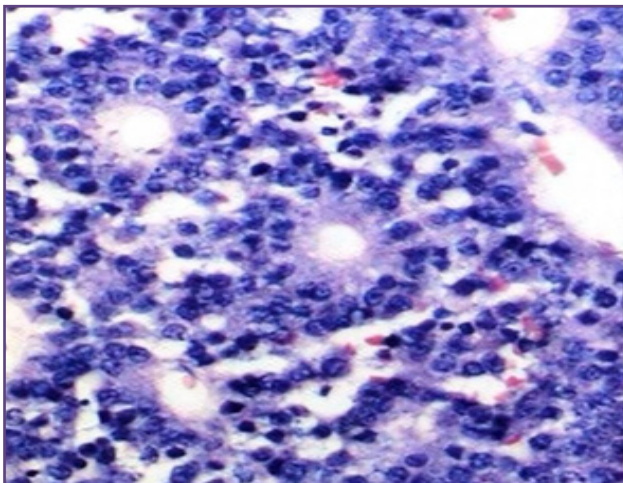


Fig. 3c: Neuroendocrine tumor showing rosette formation (H&E, X400).

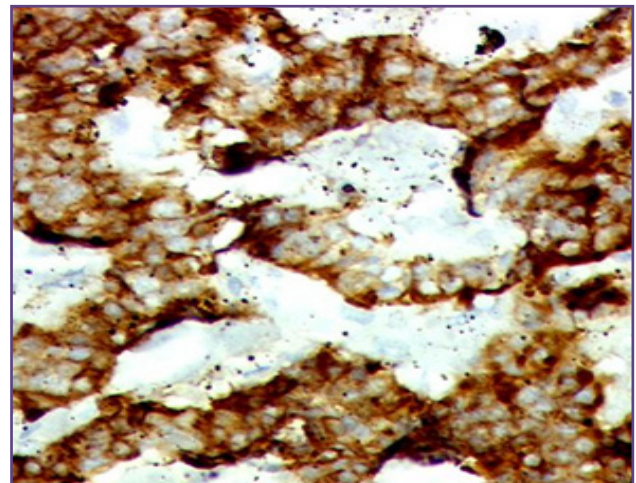


Fig. 3d: Neuroendocrine tumor showing strong chromogranin positivity.

Discussion

We reported varieties of lesions involving the nose and paranasal sinuses, affecting all age groups and both sexes. No cases were seen in first decade. All patients presented with different symptoms, but nasal obstruction was the most common presentation. Imaging study reports were received in few cases. We divided these lesions into non-neoplastic and neoplastic.

Majority of lesions reported were non-neoplastic (82%). In neoplastic lesions, benign tumours (11.8%) were more common than malignant tumours (5.5%). Parajuli et al^[9] reported 80.4% non-neoplastic lesion, 12.8% benign tumours and 6.8% malignant tumours. Similarly, Kulkarni et al^[10] reported 86.3% non-neoplastic lesion, 11.1% benign tumours and 2.6% malignant tumours. Thus, our study correlated well with these studies.

Non-neoplastic lesions were seen mainly in the 3rd-5th decade of life. Most common age group affected was 21-30 years (30.5%). They were least in the elderly age group. Humayun et al^[5] (31.4%) and Jyothi Raj et al^[11] (46.2%) also reported higher incidence of non-neoplastic lesions in 3rd decade. Parajuli et al^[9] reported majority of non-neoplastic lesions in 2nd & 3rd decade. Males were predominantly affected with male to female ratio of 1.3:1. This was similar to Lathi et al^[12] (1.3:1) and Jyothi Raj et al^[11] (1.2:1). Nasal obstruction was the most common clinical presentation seen in 84.7% cases, followed by nasal discharge (55.2%). Humayun et al^[5] also reported nasal obstruction as the most common feature (100%) followed by nasal discharge (82.5%).

Out of 105 non-neoplastic lesions, nasal polyps were the most common lesions accounting 82.9%. This was similar

to studies conducted by Lathi et al^[12] (87.5%), Kulkarni et al^[10] (69.3%) and Parajuli et al^[9](89%). The most common age group affected was 21-30 years (36.8%). The peak age of presentation in Jyothi Raj et al,^[11] Khan et al^[8] and Modh et al^[2]was also in the 2nd and 3rd decades of life. Male to female ratio was reported to be 1.2:1; similar to 1.3:1 in Jyothi Raj et al,^[11] 1.7:1 in Khan et al^[8] and 1.5:1 in Modh et al.^[2]Most common clinical presentation was nasal obstruction (86.2%). Khan et al^[8] also reported nasal obstruction as presenting symptom.

Billroth (1864) described nasal polyps as neoplastic, but Zuckerkandl considered them to be an inflammatory condition. Berdal (1959) was the first to introduce the practice of differentiating between benign and neoplastic conditions based on the histopathological classification.^[13] Several theories have been proposed to explain the pathogenesis of nasal polyp which include allergy, vasomotor imbalance, Bernoulli phenomenon, super antigen, aspirin intolerance and others.^[14] Davidsson and Hellquist^[15] classified polyps histologically into four categories: edematous or eosinophilic polyps, fibroinflammatory polyps, polyps with seromucinous gland hyperplasia and Polyps with stromal atypia. Our study showed large percentage of eosinophilic polyps (69%) similar to Davidsson and Hellquist (86%). Computerised tomography (CT) scan reported features of sinusitis or nasal polyp.

Fungal infections of nose and paranasal sinuses are increasingly recognized entity both in normal and immunocompromised individuals. Aspergillosis and Mucormycosis are the commonest of all fungal infections.^[16] Though clinical presentation and radiological findings may provide diagnostic clue for each fungal sinusitis category, histopathological examination and classification of fungal rhinosinusitis into invasive or non-invasive disease is important with regards to treatment.^[17]

In the present study fungal rhinosinusitis was seen in the 4th-7th decade of life. Mean age of presentation was 50.7 years. Montane et al^[18] reported 50 years mean age group and Soontrapa et al^[19] reported 54.8 years mean age group. It was more common in males, with male to female ratio of 2:1. Male to female ratio in other studies were 1.8:1 in Navya et al^[17] and 1.2:1 in Montane et al.^[18] Most common clinical symptom in our study was nasal obstruction (86.7%), followed by nasal discharge (60%). Also in 33.3% of cases, there was history of diabetes mellitus. Wahid et al^[20] and Soontrapa et al^[19] also reported nasal obstruction as most common presenting symptom, 85% and 27.9% respectively. History of diabetes was seen in

20% and 30.2% of cases in Wahid et al^[20] and Soontrapa et al^[19] studies respectively. Imaging studies in few cases received, reported features of polyp or mucosal thickening.

Rhinosporidiosis is a chronic granulomatous infectious disease, characterized by hyperplastic polypoid lesions of the mucous membrane. Ashworth, after a study of Rhinosporidium, proved that it was not a sporozoa, but belonged to the group phycmycetes in the sub-order of Chytridinea, and called it Rhinosporidiumseeberi, which has become its accepted name. Majority of cases are reported from India, Srilanka and Bangladesh. It usually presents as single or multiple, pedunculated or sessile masses, pink to deep red in colour, usually described as strawberry like appearance. They bleed easily with a history of nasal obstruction or epistaxis.

We reported 3 cases of rhinosporidiosis, two in the age group of 21-30 years and one in 11-20 years age group. They presented mostly with nasal obstruction. Incidence of rhinosporidiosis in our study was similar to Nayak et al^[21] (1.82%) and Lathi et al^[12] (2.5%).

Benign tumours were reported commonly in 4th decade (26.7%). Parajuli et al^[9] and Lathi et al^[12] reported benign tumours commonly in the 5th decade. Males were predominantly affected than females. Male to female ratio was 4:1. Lathi et al^[12](1.7:1) and Jyothi Raj et al^[11] (1.5:1) reported similar male predominance. Nasal obstruction was the most common clinical feature (80%), followed by nasal discharge (53.3%) and epistaxis (53.3%). Humayun et al^[5] also reported nasal obstruction as most common symptom (66.7%). Nasal discharge and epistaxis was also common feature in Humayun et al^[5] study.

Inverted papillomas are two to five times more common in males and are found primarily in the 40-70 year age group. These papillomas characteristically arise from the lateral nasal wall in the region of the middle turbinate or ethmoid recesses. Unilateral nasal obstruction is the most common presenting symptom. Grossly, these are pink, tan, or gray; non-translucent; soft to moderately firm polypoid growths with a convoluted or wrinkled surface.

We reported 6 cases of inverted papilloma in our study. Majority of patients presented in the 4th& 5th decade of life (66.6%). Male to female ratio was 5:1. Nasal obstruction was the most common clinical presentation (83.3%), followed by epistaxis (50%) and nasal discharge (50%). Khan et al^[8] reported 15 cases of inverted papilloma. The peak age of presentation was fifth decade of life and the male to female ratio was 3:1. Jaison et al^[22] reported 5 cases of inverted papilloma. Most common age group affected was 5th& 6th decade and male to female ratio was 4:1. Most common clinical presentation was nasal obstruction

and epistaxis. CT scan findings in one case showed left maxillary, sphenoid, ethmoidal sinusitis with left nasal polyp and in one case Magnetic resonance imaging (MRI) suggested features of left sphenoid, maxillary sinusitis.

Angiofibroma usually presents with nasal obstruction. The gross appearance of the neoplasm is of a lobulated, pink to purplish, smooth surfaced mass.

We reported 4 cases of angiofibroma. Males were most commonly affected than females and male to female ratio was 3:1. Most common clinical symptoms were nasal obstruction (75%) and epistaxis (75%). Parajuli et al^[9] reported 3 cases of angiofibroma with profuse recurrent epistaxis as chief complaint. Jaison et al^[22] reported 5 cases of angiofibroma in first two decades of life and male to female ratio was 4:1.

Solitary fibrous tumor was reported in a 50 year male with complaints of nasal obstruction and discharge. CT scan reported polypoidal mucosal thickening involving all the sinuses and nasal cavities. Immunohistochemically tumor cells showed diffuse cytoplasmic positivity for CD34 and CD99 (Fig. 1a & 1b). Other benign tumours included single cases of lobular capillary hemangioma, osteoid osteoma, ossifying fibroma and giant cell reparative granuloma.

Malignant tumours were seen in the age range from 19-70 years. 71.4% of cases were seen in the 6th & 7th decade. Jyothi Raj et al^[11] reported 62.5% of malignant lesions in the 6th decade. Parajuli et al^[9] reported 60% cases of malignant tumours in the 5th-7th decade. Thus malignant tumours in our study were more common in elderly patients, similar to other studies. Malignant tumours were common in females. Male to female ratio was 1:2. Female dominance was also seen in studies conducted by Jyothi Raj et al^[11] (1:1.7) and Bijjaragi et al^[23] (1:1.6). Nasal obstruction (71.4%) and epistaxis (71.4%) were the most common symptoms, followed by nasal discharge, facial swelling, headache, loss of smell and eye related symptoms. Humayun et al^[5] also reported nasal obstruction (100%) as most common symptom followed by epistaxis (75%).

Sinonasal undifferentiated carcinoma typically presents as a rapidly enlarging tumor mass involving multiple sites of the sinonasal tract, often with evidence of extension beyond the anatomic confines. The pathogenesis still remains unknown. Epstein - Barr virus has been implicated as a potential pathogen.^[24] The most common initial symptoms are epistaxis, facial pain, and nasal obstruction.

We reported 4 cases of sinonasal undifferentiated carcinoma. Two cases were reported in 6th decade, one in 7th decade and one in 3rd decade. Male to female ratio was 1:3. Nasal obstruction was most common presenting symptom in all cases. CT scan report was available in one case which

showed mass involving left maxillary, ethmoid, sphenoid sinus. Immunohistochemically tumor cells showed Pan-cytokeratin positivity in all cases (Fig. 2a & 2b).

Bijjaragi et al^[23] reported two cases of sino-nasal undifferentiated carcinoma, one each in male and female. In study by Kalpana Kumari et al^[25] malignant tumours were seen in 50% of the neoplastic cases and majority were sinonasal undifferentiated carcinomas (41%).

Sinonasal squamous cell carcinomas occur most frequently in the maxillary sinus.^[26] Symptoms include nasal obstruction; epistaxis; rhinorrhea; pain; paraesthesia; swelling of the nose or cheek or a palatal bulge; nasal mass; or, in advanced cases, proptosis, diplopia, or lacrimation.^[26]

We reported a single case of keratinizing squamous cell carcinoma in a 70 years female with complaints of nasal obstruction, nasal discharge, epistaxis and facial swelling.

Neuroendocrine neoplasms are defined as epithelial neoplasms with predominant neuroendocrine differentiation. The clinical features of sinonasal neuroendocrine carcinoma are nonspecific and similar to those of other sinonasal tumours. Common presentations include nasal obstruction, epistaxis, facial mass, and/or facial pain.

A single case of sphenoid sinus neuroendocrine tumour was observed in a 51 years male patient with complaints of headache. MRI suggested pituitary tumour involving sphenoid and ethmoidal sinus. Immunohistochemistry showed positivity for cytokeratin and chromogranin (Fig. 3a, 3b, 3c & 3d).

Conclusion

It was found that varieties of lesion affect the nose and paranasal sinuses, which included non-neoplastic and neoplastic lesions. Non-neoplastic lesions outnumbered the neoplastic lesions. Inflammatory nasal polyps were most common lesion. Non-neoplastic lesions and benign tumours affected predominantly middle age group and neoplastic lesions were common in elderly patients. Males were predominantly affected but malignant tumours were seen more in females. Nasal obstruction was the most common symptom in all lesions. Imaging studies were not always conclusive.

To conclude, sino-nasal masses or polyps can be non-neoplastic or neoplastic lesions and histopathological examination remains the mainstay in differentiating these lesions.

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