

Original Research Article

Clinical, pathological and radiological profile of sinonasal masses in patients presenting to a tertiary care center: a retrospective observational study

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ABSTRACT

Background: The study aimed to assess the profile of various pathological conditions that present with nasal mass in Indian patients.

Methods: This is a retrospective observational study of 43 patients of sinonasal masses who visited GMERS Medical College and Hospital, Sola, Ahmedabad, India during May 2017 to March 2020. The clinical profile of sinus or nasal masses were observed along with their radiological features on computed tomography scans of paranasal sinuses. The age and gender sub group were also assessed for distribution of these conditions. Most of the patients were managed with surgical techniques.

Results: Overall, clinical profile of 43 patients was observed. The clinicopathological examination aided by endoscopic and imaging studies revealed that 20 (46.5%) patients presented with the non-neoplastic masses and remaining were with neoplastic masses (53.5%). The overall M: F ratio was 1.5:1. Most of the patients belong to 11-30 years age group. The most common symptoms were mass in the nasal cavity and nasal discharge. Polyps were most common lesions seen (25.6%). Surgical intervention in the form of biopsy, excision of mass, functional endoscopic sinus surgery was performed in all patients.

Conclusions: This study gives an insight into various lesions presenting as sinonasal masses and their clinical and pathological profile. Overall, surgical management in form of excision by endoscopic or external approach is effective modality of treatment supplemented with appropriate medical management.

Keywords: Sinonasal masses, Retrospective, Polyps, Histopathology

INTRODUCTION

Nasal and paranasal sinus masses, either neoplastic or non-neoplastic are commonly encountered in clinical practice. A large number of diseases affecting the region are mainly due to several specialized tissues and their aberrations.¹ CT (computerized tomography) and MRI (magnetic resonance imaging) differentiate the contents,

contrast enhancement patterns of the lesions and localize the tumour and hence they are used frequently.¹

Careful clinicopathological workup aided by various imaging is essential for a correct and differential diagnosis for timely intervention to reduce morbidity.

The objective of this study is to clinically differentiate the various conditions presenting as sinonasal mass, to

understand each condition by clinical evaluation, histopathological examination and radiological findings and discuss various diagnostic approaches and treatment options including surgical intervention.

METHODS

This was a retrospective observational study carried out on 43 patients who presented with sinonasal mass in the department of Otorhinolaryngology, GMERS Medical College and Hospital, Sola, Ahmedabad, India during May 2017 to March 2020. The criteria for selection of all patients were mainly based on history and clinical examination. All patients presenting to ENT OPD of GMERS medical college and hospital, Sola, Ahmedabad with nasal mass, both unilateral and bilateral were included. Patients who did not give consent for investigations or treatment were excluded.

Detailed history of patients was obtained including age, gender, occupational detail, personal habits and socioeconomic statuses of patients, duration and characteristics of symptoms and associated symptoms. All patients were thoroughly assessed by clinical characteristics, nasal endoscopy and radiological imaging (CT or MRI or both). CT (computed tomography) examinations had been performed with 5 slice system (siemens CT system) with transverse slices of 0.75 mm thickness for all patients. Histopathological examinations were evaluated in all patients. Data for types of lesions, symptoms, duration of symptoms, clinical, radiological and histopathological findings were collected and assessed using Microsoft Excel 2007. The data is represented as numbers (%) and mean (standard deviation).

RESULTS

During the study period, 180 patients presented to our institute with nasal pathologies, mainly nasal polyposis or fungal sinusitis and out of them, 150 were operated for functional endoscopic sinus surgery. Amongst them, 43 patients presented with nasal masses. Out of them, 26 (60%) were men and the mean age was 33 years. Patient characteristics are summarized in Table 1, Figure 1 and 2.

Table 1: Gender distribution duration of symptoms.

Gender	Number of patients	Percentage (%)
Male	26	60.46
Female	17	39.54
Duration of symptoms		
0-6 months	20	46.51
6 months – 2 years	15	34.88
2 – 5 years	6	13.95
> 5 years	2	4.65
Total	43	100

Table 2: Common lesions found in our study.

Lesion	Percentage (%)
Nasal polyps	25.6
Hemangiomas lesions	13.9
Inverted papillomas	13.9
Rhinoliths	9.3
Fungal sinusitis	4.7
Rhinosporidiosis	4.7

Table 3: Distribution of cases.

Benign	No.	Malignant	No.	Infective	No.	Non-infective	No.	Benign
Epitheloid hemangio-endothelioma	2	Non – hodgkin’s lymphoma	1	Inflammatory polyp	3	Rhinolith	4	Epitheloid hemangio-endothelioma
Inverted papilloma	6	Nasopharyngeal carcinoma	1	Antro-choanal polyp	8	Rosai dorfman disease	1	Inverted papilloma
Nasopharyngeal angiofibroma	2	Squamous cell carcinoma	2	Rhinosporidiosis	2	-	-	Nasopharyngeal angiofibroma
Nasal glial heterotopia	1	Sarcoma	1	Invasive aspergillosis	2	-	-	Nasal glial heterotopia
Juvenile psammomatous ossifying fibroma	1	Plasma-cytoma	1	-	-	-	-	Juvenile psammomatous ossifying fibroma
Capillary hemangioma	3	Olfactory neuro-blastoma	1	-	-	-	-	Capillary hemangioma

Continued.

Benign	No.	Malignant	No.	Infective	No.	Non-infective	No.	Benign
Spindle cell hemangioma or hemangiopericytoma like tumour of nasal cavity	1	-	-	-	-	-	-	Spindle cell hemangioma or hemangiopericytoma like tumour of nasal cavity
Total	16 (37.2%)	Total	7 (16.2%)	Total	15 (34.88%)	Total	5 (11.62%)	Total
Benign	No.	Malignant	No.	Infective	No.	Non-infective	No.	Benign
Epitheloid hemangio-endothelioma	2	Non – hodgkin’s lymphoma	1	Inflammatory polyp	3	Rhinolith	4	Epitheloid hemangio-endothelioma
Inverted papilloma	6	Nasopharyngeal carcinoma	1	Antrochoanal polyp	8	Rosai dorfman disease	1	Inverted papilloma
Nasopharyngeal angiofibroma	2	Squamous cell carcinoma	2	Rhinospordiosis	2	-	-	Nasopharyngeal angiofibroma
Nasal glial heterotopia	1	Sarcoma	1	Invasive aspergillus is	2	-	-	Nasal glial heterotopia
Juvenile psammomatous ossifying fibroma	1	Plasma cytoma	1	-	-	-	-	Juvenile psammomatous ossifying fibroma

The clinicopathological examination aided by endoscopic and imaging studies revealed that 20 (46.5%) patients presented with the non-neoplastic masses and remaining were with neoplastic masses. Out of 23 (53.5%) neoplastic masses, 16 (37.2%) were benign and 7 (16.3%) were malignant masses.

Age of presentation ranged from 1st to 8th decade of life with highest incidence in age group 11-30 years (51.2%) (Figure 1).

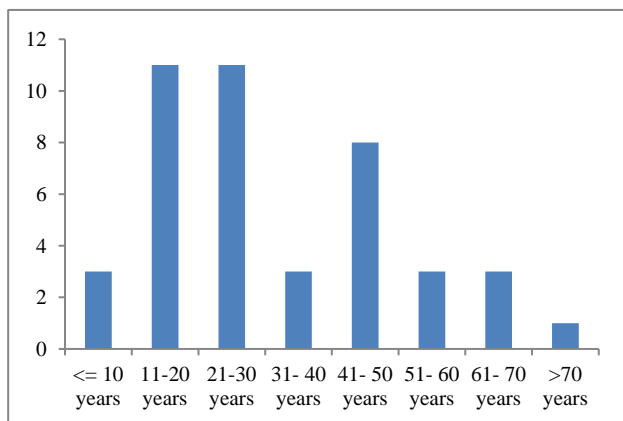


Figure 1: Age distribution of patients.

In this study numbers of lesions of unilateral involvement were 9.3% and of bilateral involvement were 90.7%. The most common symptom was nasal obstruction followed by something coming out from nose. Polyps were most common lesions seen (25.6%). Distribution of other lesions is given in (Table 2).

The distribution of cases and their classification scheme is given in (Table 3).

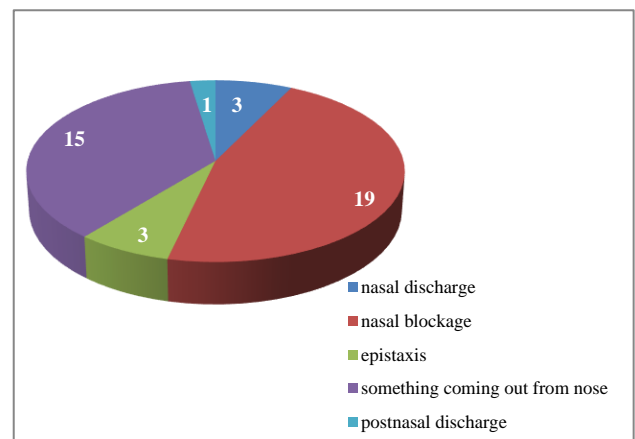


Figure 2: Symptoms of patients.

Nasal polyps

Nasal polyps were the most common lesion in our study. There were 12 cases of nasal polyposis presenting as nasal mass, out of which 4 had ethmoidal polyps and 8 had antrochoanal polyp. Two cases of antrochoanal polyp had presented with recurrent polyposis. The age range was from 9 to 65 years. All patients presented with symptoms of nasal stuffiness and obstruction. Other symptoms were alteration of smell, headache, sneezing, and discharge suggestive of allergic etiology. Functional endoscopic sinus surgery was performed in all patients with satisfactory results on follow up. None of the patients required revision surgery (Figure 3).

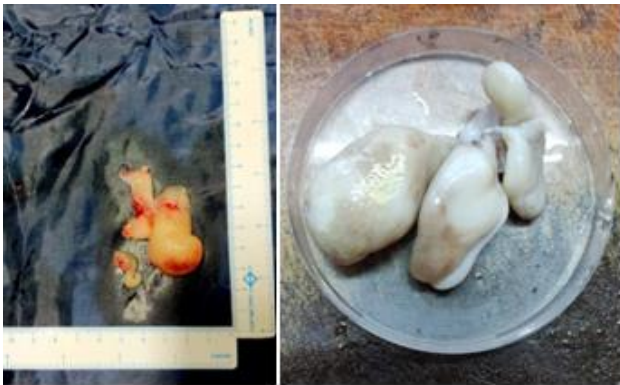


Figure 3: Resected specimens of antrochoanal polyps.

Rhinoliths

Rhinoliths were found in four middle aged (15-45 years) patients (2 male and 2 female) having history of unilateral nasal obstruction with unilateral nasal mass. Two patients gave additional history of trauma few years before onset of symptoms. Two of them presented with foul smelling nasal discharge with unilateral nasal obstruction. Other two patients presented with nasal bleeding on pricking of nose with intermittent nasal obstruction. All patients underwent endoscopic removal of the stony hard mass under general anaesthesia (Figure 4).



Figure 4: A 4 cm long rhinolith specimen after endoscopic removal from left nasal cavity of a 22-year-old male.

Rhinosporidiosis

Rhinosporidiosis was found in two male patients in 2nd decade of life. Nasal blockage, irritation and epistaxis were the modes of presentation. Friable, polypoidal, reddish strawberry like mass in the nasal cavity studded with greyish dots of sporangia was seen on nasal endoscopy. In both the cases, it was confined to the nasal cavity. Endoscopic excision of the entire mass lesion followed by cauterization of the surrounding mucosa was done in both patients. None of them showed recurrence.

There were two patients of fungal sinusitis who presented with unilateral nasal mass, unilateral nasal blockage, thick foul-smelling nasal discharge and itching. CT PNS showed foci of typical calcification and heterogenous attenuation. Functional endoscopic sinus surgery was performed in all patients followed by oral antifungal drugs for 1 month along with regular nasal douching. Histopathology of both cases showed allergic fungal sinusitis due to *A. fumigatus*. Patients were asymptomatic during follow up period of 1-year post operatively with well healing cavity on postoperative nasal endoscopy.

Inverted papillomas

Inverted papillomas were found in 6 patients who presented with unilateral nasal mass and nasal obstruction followed by nasal discharge, epistaxis, headache, and facial fullness. Nasal endoscopy showed a reddish-grey lobulated tumour, firmer than an inflammatory polyp, with a fairly characteristic “raspberry” aspect with or without secondary polypoidal changes. On palpation, the mass was friable and bled on contact. CT scan was done in all cases with most showing bowing of the medial wall of maxilla with local bony destruction surrounding the soft tissue mass and widening and blockage of osteomeatal complex. The mass was extending to nasopharynx in two out of six cases. It was found more commonly on right side.



Figure 5: An adult male patient presenting with hemangiomatous mass protruding from left nasal cavity.

Five cases of hemangiomatous lesions were found in our study. Out of them, one was an epitheloid hemangioendothelioma, a rare entity, three were capillary hemangiomas, and one was a spindle cell haemangioma (hemangiopericytoma like tumour) of nasal cavity. All patients presented with unilateral reddish nasal mass, gradually increasing in size, and bleeding on touch or trauma. Endoscopic excision of the mass was performed in all patients followed by cauterization of the base of lesion. No recurrence was observed postoperatively during 6 months period (Figure 5).

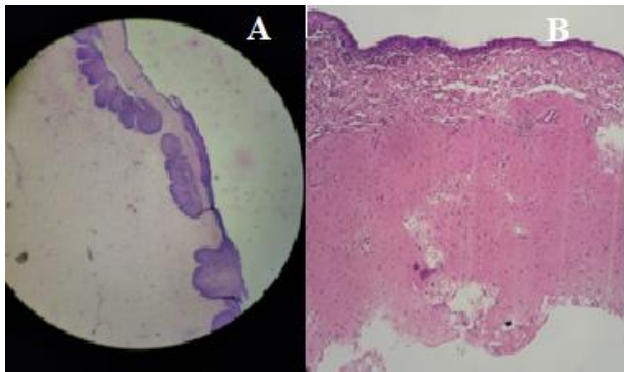


Figure 6: (A) A papilloid structure lined by squamous epithelium with invagination of the superficial epithelial nest into the underlying stroma. (B) Nasal glial heterotopia showing respiratory epithelium and normal glial tissue.

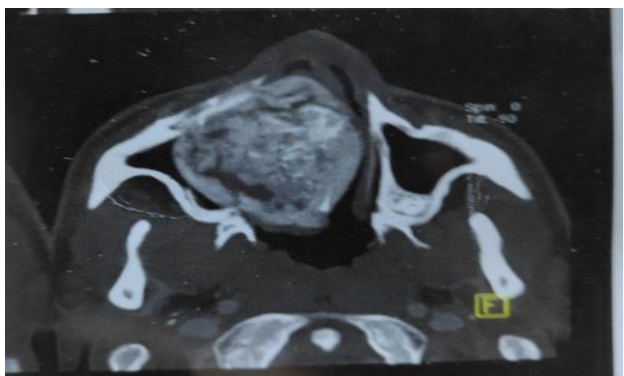


Figure 7: CECT paranasal sinuses and orbit revealed well defined expansile osteolytic lesion in right ethmoid and frontal sinus in juvenile ossifying fibroma.

Among fibro-osseous tumours, we came across a rare case of juvenile psammomatoid ossifying fibroma in a 18 year old male who presented with complain of bilateral nasal blockage with right eye blurring vision and watering. Contrast enhanced CT paranasal sinuses and orbit revealed well defined expansile osteolytic lesion in right ethmoid and frontal sinus extending up to nasal cavity bulging into right orbit and displacing the globe. The mass was removed by lateral rhinotomy approach. Tissue histopathology revealed both fibrous and osseous elements with proliferating fibroblast like spindle cells in

the fibrous area. Complete excision of the mass relieved the symptoms, however the facial deformity persisted (Figure 7).

One patient was diagnosed of Rosai dorfman disease. He presented with left nasal blockage and intermittent epistaxis. After endoscopic biopsy of the mass, complete excision was done with no signs of recurrence on follow up. The youngest patient, a 6-month-old male child presented with left nasal mass since birth which was soft, incompressible and having constant size on body postural changes. Complete endoscopic excision was done and histopathology revealed respiratory mucosa with submucosal normal glial tissue and foci of gliosis suggestive of nasal glial heterotopia.

Two patients of nasopharyngeal angiofibroma presented with unilateral nasal mass and unprovoked epistaxis. Nasal endoscopy showed reddish mass occupying entire nasal cavity extending to nasopharynx and covering both choanae. Contrast enhanced CT scan study showed heterogeneously enhancing soft tissue density polypoidal mass lesion in nasal cavity extending naso and oropharynx and sphenopalatine foramen with widening of retromaxillary space. Both patients were operated for excision of the tumour by lateral rhinotomy combined with transpalatal approach. On histopathological examination, thin walled capillary vascular space separated by paucicellular fibrous stroma with focal area of stromal myxoid changes and loose areolar stroma were identified.

Amongst malignant masses, most common was squamous cell carcinoma of nose. One case each of Non-Hodgkin's lymphoma, nasopharyngeal carcinoma, sarcoma and rare tumors like plasmacytoma and olfactory neuroblastoma were found in our study. Most of them presented with complain of unilateral nasal mass with nasal blockage. Diagnosis was done based on CT imaging followed by biopsy for histopathological examination.

The patient diagnosed with olfactory neuroblastoma was an 82-year-old female with complain of left nasal blockage from 15 days with intermittent epistaxis. Nasal endoscopy showed mass covering entire left nasal cavity extending superiorly to cribriform plate and bleeding on contact. CECT PNS showed polypoidal soft tissue lesion in left anterior nasal cavity with inhomogenous post contrast enhancement. Endoscopic excision of the mass was done and histopathological examination showed round cells with nuclear pleomorphism and stippled salt pepper chromatin – round blue cell tumour pattern.

DISCUSSION

It is important to recognize non neoplastic and neoplastic benign lesions from malignant ones because of different treatment modality and to lessen economical burden to the patient.²

In our study the male: female ratio was 1.5:1 which is similar to other Indian studies. Lathi et al showed male to female ratio of 1.5:1.3 In the study by Zafar et al from India, male to female ratio is 1.7:1.4 Gupta et al found overall male to female ratio of 1.35:1 while for Rawat et al overall M:F ratio was 2.1:1.⁵

In this study, most of the patients with nasal mass presented in 2nd to 4th decade of life. Most of the earlier studies also showed similar results. Malignancies have been reported generally after the 3rd decade of life in present study as with other studies. In the present study, mean age of presentation comes out to be 33 years. Bakari et al had also reported a peak incidence of 33 years, while for Zafar et al the mean age of presentation was 22.5 years.^{4,6}

In present study, the most common presentation of the sinonasal masses were nasal obstruction (44.2%). Gupta et al reported that main presenting symptoms of sinonasal masses were nasal blockage (94.5%) and rhinorrhoea (90.2%). According to Bakari et al, the main presenting symptoms were nasal blockage (97.4%), rhinorrhoea (94.7%), allergic symptoms (52.6%), anosmia (34.6%). Lathi et al found nasal obstruction (97.3%) to be most common.^{4,6}

The occurrence of nasal polyps was in our study was 25.6% which was comparable to other similar studies.⁶⁻⁸ Chavan et al showed the most common benign sinonasal mass as the nasal polyp.⁹ On examination, the mass was pale, glistening grape-like, insensitive to probing and did not bleed on touch. CT studies of antrochoanal polyp patients showed opacification of the right maxillary sinus with a low-attenuation, non-enhancing mass extending from the maxillary sinus through an enlarged ostium and then projecting posteriorly through the nasal cavity into posterior nasopharynx. Inflammatory ethmoidal polyps were seen on CT as soft tissue density polypoid masses within the nasal cavity and paranasal sinuses. In severe cases, the sinuses are completely obliterated and remodelling of sino-nasal bones is common. All the nasal polyps removed surgically were submitted for histopathological examinations as both benign tumors such as inverted papilloma and malignant tumor like mucinous adenocarcinoma can mimic or coexist with "ordinary" nasal polyps.⁹

Microscopically, the polyps were composed of loose mucoid stroma infiltrated by lymphocytes, plasma cells, neutrophils with the mucus glands and bony trabeculae.

Fungal rhinosinusitis, once considered a rare disorder, has been reported with increasing frequency worldwide over the last 2-3 decades.^{10,11} All AFRS were due *Aspergillus* species and mucin in the specimen which is important in diagnosis was present in all cases.¹¹ Debulking of mass lesion with functional endoscopic sinus surgery was performed along with medical

treatment with oral antifungal drugs (fluconazole or voriconazole).

Rhinosporidiosis occurs universally, although it is endemic in south Asia, notably southern India and in Sri Lanka. The most common presumed mode of infection from the natural aquatic habitat of *R. seeberi* is through the breached nasal mucosa.¹² In our study, a CT paranasal sinus was done to rule out other causes and showed polypoidal soft tissue lesion confined to nasal cavity. Histology showed vascular fibro myxomatous structure with submucosal sporangia containing innumerable endospores seen by H and E stain.

Inverted papilloma, which was the most common benign lesion in our study (Figure 5), was evident in 6 patients (13.95%) which is much higher than similar studies. Inverted papilloma is characterized by its predilection for males, local invasion, tendency for recurrence and association with malignancy.¹³ All our cases had unilateral nasal obstruction, nasal discharge, epistaxis, headache, and facial numbness/fullness which is similar to those of Weissler et al.¹⁴ CT scan showed bowing of medial wall with bony erosion at places as was shown in other studies.^{13,15}

Haemangioma of the nasal cavity is predominantly capillary and is found attached to the nasal septum. Cavernous haemangioma is rarely seen in the sinonasal tract.¹⁶ In our study, 4 cases were capillary hemangiomas, rest being epitheloid hemangioendothelioma and spindle cell hemangioma. 3 cases of capillary hemangiomas in our study were middle aged females and one being middle aged male. Among the benign lesions, capillary haemangioma (6.9%) was second most common lesion in our study. All cases were found to be arising from the nasal septum or from the nasal floor or the vestibule of nose. Symptoms of nasal blockage, nasal discharge, spontaneous epistaxis, hyposmia were rarely seen. On CT examination, polypoidal lesion was noted in anterior nasal cavity abutting inferior turbinate or nasal septum in most cases. Complete endoscopic excision was done in all cases. HPE examination showed closely packed spindle cells with spaces containing little blood with scant fibrous stroma. The clinical findings and imaging characteristics were similar to study by Nepal et al.¹⁷

Nasal glial heterotopia, a rare condition had characteristic, Contrast enhanced CT findings of nasal glial heterotopia showed 10x8 mm fluid density lesion with foci of calcification causing blockage of entire left nasal cavity. MRI was also done in this case to rule out intracranial extension. Complete endoscopic excision was done and histopathology revealed respiratory mucosa with submucosal normal glial tissue and foci of gliosis suggestive of nasal glial heterotopia (Figure 5). It is a non-malignant developmental abnormality with variable presentation such as congenital nasal mass, midline face swelling, and nasopharyngeal mass causing nasal

obstruction.¹⁸ Rarely may it be communicating with brain via a stalk.

One case of Rosai Dorfman disease was found which is a rare benign disease of unknown etiology and generally manifests with bilateral cervical lymphadenopathy. On nasal endoscopy, bilateral irregular fleshy mass filling entire nasal cavity with irregular surface which bled on touch was observed. CECT PNS showed polypoidal mucosal thickening in bilateral ethmoid sinus extending into bilateral nasal cavity and nasopharynx on left side.

Malignancy of sinonasal tract is rare. The maxillary sinus is the most common site of origin, while the most common histological type is squamous cell carcinoma.^{19,20} It is rarely encountered before the 4th decade of life. In this study, all the tumours originated in the maxillary sinus except 2 cases, one of which was nasopharyngeal carcinoma extending into sinuses & nasal cavity, eroding the lateral wall of nasal cavity, and another was an olfactory neuroblastoma extending from cribriform plate level to entire nasal cavity. Findings were similar to other studies. 20 Patients diagnosed with plasmacytoma, olfactory neuroblastoma and non-Hodgkin's lymphoma were further sent for immuno histochemical examination. All patients were sent to higher centre for radiotherapy and surgical treatment after establishment of diagnosis.

Today, in sinonasal pathologies, after the clinical examination when further examination is needed to exclude the malignancies and detect distant metastasis, contrast enhanced CT or MRI is the preferred technique.¹⁹ Soft tissue is better visualized by MRI whereas on the bony areas CT has more advantages. CT scan with coronal cuts is preferable prior to surgery and mandatory if endoscopic sinus surgery is to be performed. It will show the anatomic variations including any alterations brought by the disease or by previous surgery. In fully ossified lesions (rhinoliths, fibrous dysplasia) sclerosis was seen on CT. Smoothly bordered, non-enhancing lesions (cysts, secretions) were easily identified on CT. Uniform contrast enhancement was seen in hemangioma and angiofibroma. Necrosis, invasion and destruction of surrounding structures were seen in malignant neoplasm, granulomatous reactions and invasive aspergillosis.

The mainstay of radiologic examination in the tumors of nasal cavity is not only to make a differential diagnosis but also to explore the origin, dimensions, orientation of the mass to the surrounding structures, contours and the contrast enhancement of the tumor.¹⁹

Radiological investigations may also help in understanding the type of pathology, extension of lesion and associated sinus pathology. It is to be used as first line tool for diagnosis of malignant cases where extent of disease is important factor for further management. It is also to be required prior to surgery to correctly map out

the anatomy. Most of non-neoplastic and benign neoplastic nasal masses require surgical excision.

CONCLUSION

Sinonasal masses have various differential diagnoses. Malignancy should be distinguished from non-malignant lesions. The presenting features, symptomatology and advance imaging techniques like CT scan with diagnostic nasal endoscopy help to reach presumptive diagnosis and knowing about the nature and extent of the disease. It also helps in planning of surgical management but histopathological examination remains the mainstay of final diagnosis. Surgery remains the treatment of choice for all non-neoplastic and benign lesions supplemented by medical therapy if required. Thus, a careful clinical, radiological and histopathological examination is mandatory for proper diagnosis and early treatment of the patients. Our study is limited by the fact that the outcome measures were subjectively assessed even though it was by qualified otolaryngologists. Another limitation is the small sample size so the study may not correlate to findings of the city in general.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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